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COMMODORE

COMPUTING INTERNATIONAL

The Independent Commodore Magazine

WIN

The Hobbit

in our **FREE** supplement



PLUS

* News

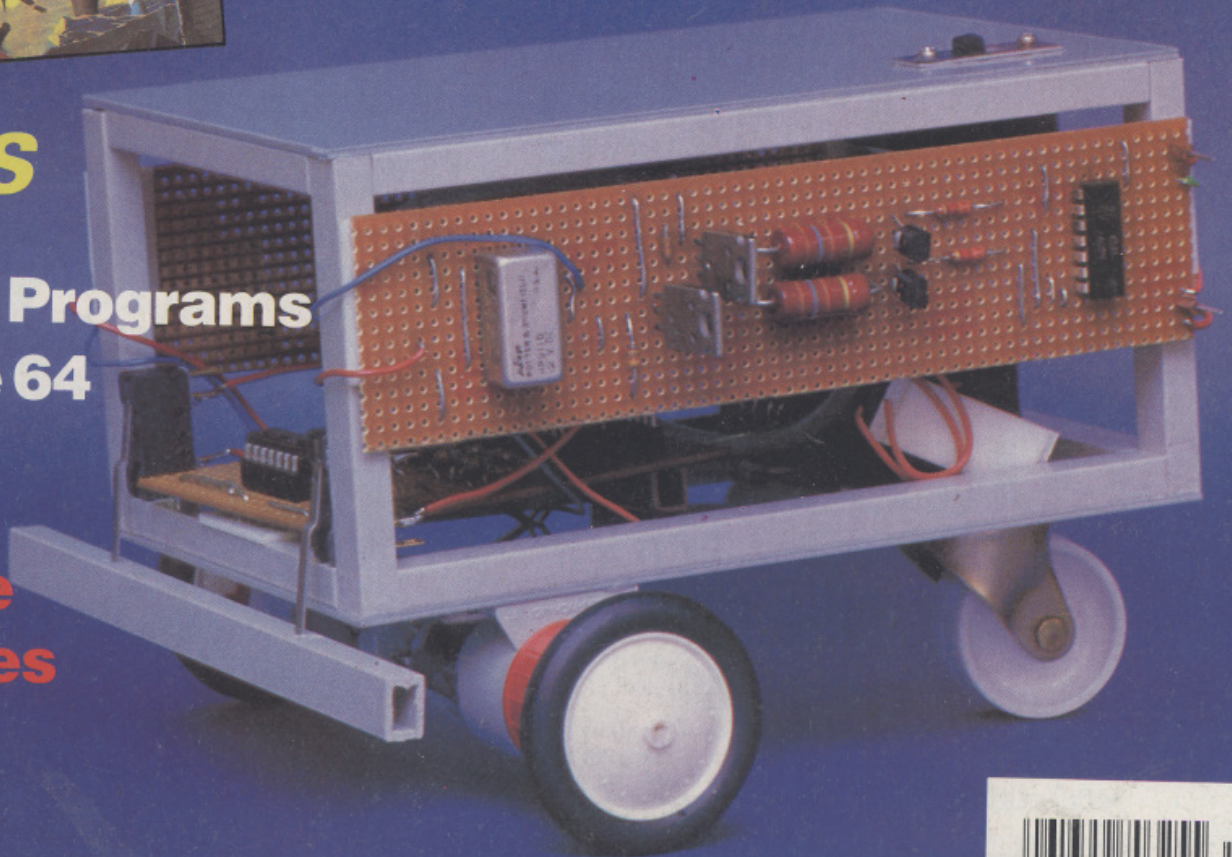
* Reviews

* Program Listings

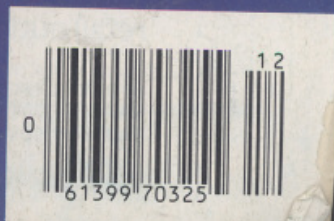
PLUS

**Music Programs
on the 64**

**Micro
Mouse
Amazes**



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If the apes don't get you the crocodiles will!

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rampaging apes and
ravenous crocodiles!



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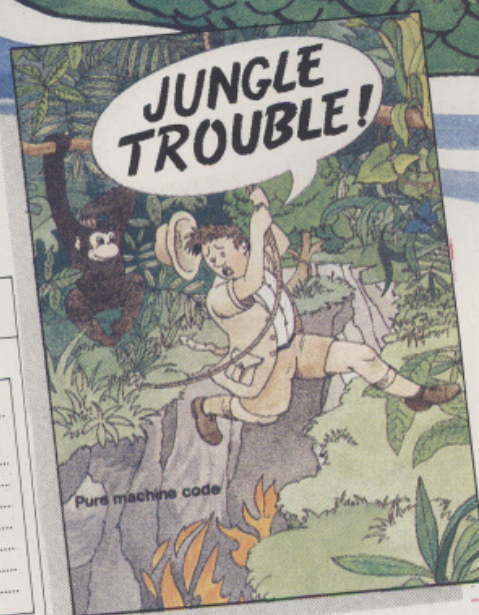
2)

3)

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COMMODORE

COMPUTING INTERNATIONAL

MAY 1984

COVER STORY



With the approach of the 1984 Euromouse competition, we offer some guidelines to building your own robot mouse

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NEXT ISSUE

SHOW MUSIC: Some surprises for the Commodore show.

MORE MUSIC: How far have you got with our keyboard project? In our June issue we recap the project so far and show how to display your keyboard on the screen.

MORE MOUSE: The next in our series on building your own robot mouse.

Now the Commodore 64 means business

The Game's over. Wouldn't you like to increase the applications potential of your Commodore 64? Transform it from a fun family computer into a truly professional tool? Now — thanks to Handic, the world's largest creator of Commodore software — you can give a powerful new dimension to your 64's performance. We have pioneered a new program called **CALC RESULT** that dramatically expands the financial planning potential of your Commodore.

Doctors, Dentists, Lawyers, Bankers, Brokers and other money managers exploit it to keep track of complex client accounts. Builders, Garage Owners, Retailers of all sizes, and

descriptions now use the spread sheet formula for instant feedback and analysis of trading results.

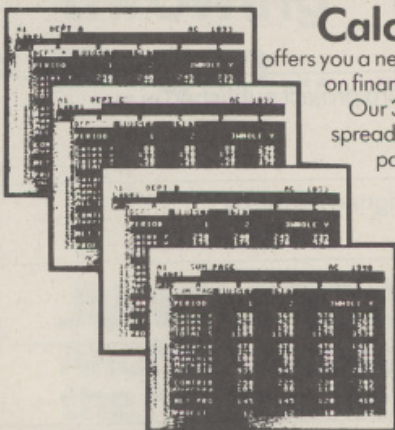
In a world where ease of access and speed of assessment are essential, **CALC RESULT** gives everyone the power to harness the untapped potential of their Commodore.

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I would like you to send by return post further information on the Handic 64 range. CC2

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handic
software Ltd

Thinking ahead

Ping-Pong Housing

Robots already look set to take over all our manual labour, but now it seems that they are about to take over our leisure as well! A Ping-Pong (table tennis) competition has been announced, not for humans but robots.

The Steering Committee of the International Personal Robot Congress and Exposition (IPRC) have accepted a British challenge for the tournament which is to take place in 1986.

Dr John Billingsley of Portsmouth Polytechnic conceived the idea and contest organisers believe that the sensor technology enabling robots to 'see' the ball and then return it to their opponents will become available in the next two years. It is also expected that most of the 'competitors' will be built by enterprising individuals rather than by large manufacturers.

Trials for the selection of the American team will take place at IPRC '85.

A special scaled-down version of a Ping-Pong table has been designed for the competition, with a frame at either end. Above the net is another 50cm square frame to outlaw the unsportsrobotlike practice of lobbing the ball out of view of the opponents sensors!

For information on the IPRC **contact:** IPRC, 777 Locust Street, Denver, Colorado 80220.

For information on the contest itself **contact:** Dr John Billingsley, Dept of Electrical and Electronic Engineering, Portsmouth Polytechnic, Angelsea Road, Portsmouth.

Advances in Microtechnology, particularly in micro-electronics, are having considerable effects on the design of homes. The number of people working from home has risen dramatically in the last few years and few homes are built to encourage working activity.

In the last decade public and private housing have been at least 10% smaller in area than in the '60s and the Housing Associations Charitable Trust are concerned that everyone in the Housing Industry should realise that there will have to be changes in housing designs in the UK.

Concept

Lion House, a new computer retail centre is launching a new concept in selling micros to the business and home markets. The redecoration of their Tottenham Court Road premises is just being completed and it will be renamed Micro Systems.

Spread over five floors, Lion plan to have several different sections including departments concentrating on hardware and accessories for the home market; business systems; an advisory centre for first time buyers; a fifty seat lecture theatre for seminars and training and a press centre with free database and word processing facilities.

Contact: Lion House, 227 Tottenham Court Road, London W1P 0HX. Tel: 01-580 7383.

CBM packages

Commodore are trying to consolidate their position in the microcomputer business market by offering five packages with considerable price reductions to cover every size of business.

Each package includes hardware, software and peripherals necessary to satisfy the demands of most businesses. The five packages available are as follows:

A 700B computer and monitor, SFD 1001 single disk drive, 4023 printer, cables and three software packages (Superscript word processing systems, Superbase filing system and Calc Result spreadsheets) reduced from £2,713 to £1,495.

A 700B computer and monitor, SFD 1001 single disk drive, 6400 printer plus cables and three software packages (Superscript, Superbase and

Calc Result) reduced from £3,363 to £1,995. A 7105B computer with integral monitor, 8250 dual disk drive, 4023 printer, cables and three software packages (Superbase and Calc Result) reduced from £3,204 to £1,975.

A 710B computer with integral monitor, 8250 dual disk drive, 1361 printer, cables and three software packages (Superscript, Superbase and Calc Result) reduced from £3,484 to £1,995.

A 710B computer with integral monitor, 8250 dual disk drive, 6400 printer, cables and three software packages (Superscript, Superbase and Calc Result) reduced from £3,854 to £2,495.

Contact: Commodore Information Centre, 675 Ajax Avenue, Slough. Berkshire SL1 4BG. Tel: 0753 79292.

Welcome

Kenneth Baker MP, Minister of State for Industry and Information Technology, recently welcomed Commodore's decision to open a factory in Corby. He said: "Regional financial incentives have been used in a constructive way to help this project go ahead in Britain and bring the benefits of a significant number of new jobs for Corby and a welcome addition to our growing information technology related industries."

Commodore's Corby factory is Europe's largest microcomputer factory, creating 600 jobs this year with an additional 400 jobs being generated as the factory gears up production.

Production commences in September. The factory will initially produce 200,000 microcomputers a month and has the expansion capacity to produce over 350,000 units a month. Two-thirds of production will be exported to Europe and countries such as Australia and the Middle East.

Talk

A two-day conference discussing how to avoid losses through piracy is being organised by Business Research International. It will take place at the Park Lane Hotel, London on June 4-5.

Subjects on the agenda include: specific steps you can take to combat piracy; what your rights are in law; when to use litigation - a cost/benefit analysis; why protection should be treated as an investment; the latest technology available to protect your programs; how proposed changes in legislation will affect your position; what new protection problems may be created by knowledge based systems; plus two case studies.

The cost of this conference is £396.75, with a 10% reduction if two or more delegates attend.

Contact: Business Research International, 57/61 Mortimer Street, London W1N 7TD. Tel: 01-637 4383.

In the Pipeline

Marshall Smith, the new president of Commodore has been planning some interesting moves since he took over from Jack Tramiel. Commodore have signed a technology

licensing agreement with the manufacturers of Hyperion, a IBM compatible machine and by the end of this year Commodore are hoping to have their own IBM compatible machine in production.

64 hardware

Product	OUR PRICE	Product	OUR PRICE	Product	OUR PRICE
(a) Commodore 64	£195	(h) Epson RX80	£275	(n) package (a) + (b)	£230
(b) 1530 cassette unit	£ 45	(i) 1701 monitor	£210	(o) package (a) + (c)	£387
(c) 1541 disk unit	£199	(j) parallel interface		(p) package (a) + (c) + (e)	
(d) SX64 + £250 software		(k) interface to convert and link 64 to (g)	£ 25	+ Easy Script, Easy File and into Basic	£620
(e) MPS801 printer	£199	(l) any cassette recorder (all on disk)			
(f) 1526 printer	£310	(m) to 64/Vic20 use	£15	(Offers subject to Commodore supply)	
(g) Epson FX80	£400				

Prices include VAT. Carriage is free except on credit orders. A full range of hardware and software is available by mail from us. Ask for prices and details. Alternatively, visit The DGH Software Centre's new shop at 10 North Street, Ashford, opening end of May. A full range of books also available by mail order at normal retail price plus £1 p&p.

software selection

Please note that the prefix (d) before a price denotes that the program is available on disk (for example d25). The prefix (r) (as in r29) indicates that the program is in cartridge form and costs £29.00. Tape program prices have no prefix. Thus (d29) indicates a disk version at £29.00 and a tape version at £16.00.

WORD PROCESSING

PAPERCLIP (d90) is the most sophisticated and versatile word processing program for the 64. Very good too is **VIZAWRITE** (r78 d65) which also has a spell-check program **VIZASPELL** (d20 if bought with **VIZAWRITE**, else d65). But for casual wordprocessing of extreme sophistication, we recommend **HOMEWORD** (d35) which is outstanding value and very easy to master. It uses 'icons' to symbolize menu options (as used by Lisa). Contains several really innovative features. Much further down the scale but ideal as a low cost text editor is **WORD WIZARD** (5.99). Compatible labelling programs are available.

UTILITIES

DISKEY (d36) is a really powerful disk editor which enables you to manipulate fully your 1541 and files produced on it. **PROGRAMMER'S UTILITIES** (d14.99) surely represents the best value if you have a disk: sprite, character, and sound editors are provided in addition to a PET emulator, and disk copy utilities - a dozen in all!

PROGRAMMING AIDS

These range from improvements to C64 BASIC to actual programming aids. **SIMONS BASIC** (r50) adds 114 extra commands and facilities, and the rather better planned program **BC BASIC** (50 17.95) does much the same. Best of the compilers and excellent value is **PETSPED** (d56). On the machine code front there are numerous monitors and assemblers the best of which is **MIKRO ASSEMBLER** (r53) but **MONITOR** (r29.95) **ASSEMBLER** 64 (6.75) **MASTERCODE DEVELOPMENT** (d24.95) **HESMON** 64 (r25) **MASTERCODE ASSEMBLER** (14.95) can all be recommended. If you want to learn about machine code programming we suggest **ASSEMBLER TUTOR** (d29.95 29.95) or Honeyfold's **BEGINNER'S ASSEMBLY LANGUAGE PROGRAMMING** (14.95) if you plan writing your own database programs highly recommended are **CODEWRITER** (d85) and **THE LAST ONE** (d97) which both produce stand-alone code.

DATAFILES/DATABASES

Unquestionably, the one program to have if you can afford it is **SUPERBASE** 64 (d88) which we have on special offer by way of encouragement! This is a sophisticated, programmable relational database. Think of what you would like your database program to do - and **SUPERBASE** will probably be able to do it! Very, very powerful and very, very versatile. **INFODISK** (d73) and **DELPHI** (d80) are very similar and offer larger individual records but more restricted programming constraints. Multifunction database processors include the excellent **MAGPIE** 64 (r95) **INFOMAST** (d90) and **VIZASTAR** (d99). All these programs are capable of serious disk-orientated business applications. **DIARY** 64 (r30) is a really excellent 'single page' dailies for tape or disk records.

FINANCE & BUSINESS

CALCRESULT (d95) is a very sophisticated 3D spreadsheet we highly recommend for serious business uses. **PRACTICALC** (d40 33) is very good value. Also: **FUTURE FINANCE** (d75) and **BUSICALC** 2 (d79 77). For home accounts there's **BANK MANAGER** (d10 7.50) **HOUSEHOLD FINANCE** (21) **MONEY MANAGER** (9.99) the very sophisticated **HOME ACCOUNTANT** (d52.50) **TIME & MONEY MANAGER** (d49). Business account programs are available also. These usually form part of a suite of related business programs. For a low cost example **BUSCOM-1**, **BUSCOM-2**, **BUSCOM-3** and **BUSCOM-4** are for monthly accounts, wages, retail accounts, and stock system respectively (all d21 19 - demonstration versions at d4.50 2.50 each). Expensive and sophisticated alternatives are also available. For VAT record-keeping and a full audit trail we unreservedly recommend **MICRO SIMPLEX** 64 (d175). A very professional program with full product support. Suits Schemes A to F. Demo available.



ACCESS/VISA credit card hot-line:

(0227) 266289

If answering machine is in use be prepared to state program name, your credit card number and expiry date, your address and telephone number.

This is a selection of some of the best programs for the Commodore 64 from a list of over 800 we can supply, covering the products of 100+ software houses from the UK, rest of Europe and the USA. A 20-page listing and later updates are available free to customers (otherwise 50p and large SAE. Add 50p p&p for orders under £20. (Europe £1 on each item of software).

RECREATIONAL

We can supply any of the popular games from established software houses and this includes an unbeatable selection of imported material. If there's a program for the 64... we can usually provide it! Look out for **ALICE IN WONDERLAND** (d27) and the definitive C64 **FLIGHT SIMULATOR II** (d35). Really good imports include **BLUE MAX** (d29 29) which has truly outstanding graphics and diagonal scrolling like **ZAXXON** (d29 29) which is at last available. There's also **PROTECTOR II** (d25 25) **FORT APOCALYPSE** (d23 23) **PITSTOP** (r27.50) **JUMPMAN** (d27.50 27.50) and **JUMPMAN JUNIOR** (r27.50)... but there are many others! Interested in adventuring? Highly recommended are the following: **COLOSSAL ADVENTURE**, **ADVENTURE QUEST**, **DUNGEON ADVENTURE**, **SNOWBALL**, **TIME LORDS** and **TWIN KINGDOM VALLEY** (all 9.50 each) **THE HOBBIT** (14.50), plus Infocom's **ZORK**, **WILL**, **STARCROSS** (all d29 each) **WITNESS**, **DEADLINE**, **SUSPENDED**, **ENCHANTER**, **INFIDEL**, **PLANETFALL**, (all d36 each). A good range of Commodore cartridge software is now available - best of these is **INTERNATIONAL SOCCER** (d3.99). **CPM** (rd 60) gives you the benefits of the Z80 processor and a full operating system. **PILOT** (d65) is an outstanding tool and authoring language for creating educational programs with ease. **LOGO** (d39.95) also now available.

Our list includes details of **EDUCATIONAL**, **ACCOUNTING**, **BUSINESS** and **GAMES** programs not possible to itemize here. PLEASE TRY US IF YOU ARE HAVING DIFFICULTY LOCATING A PROGRAM. Please make cheques/PO's payable to the Six-Four Supplies Company.

the six~four supplies company

P.O. Box 19, Whitstable, Kent CT5 1TJ. Incorporated by The DGH Software Centre, Ashford, Kent (a division of T. Denne & Sons Ltd)

Monitor range

New company Compuser are launching a range of British-made colour monitors for home users as well as small businesses.

Two medium resolution and two standard 14 inch monitors are available. The medium resolution monitors, costing £395 plus VAT, display a text width of 80 characters and feature an anti-reflection face plate to eliminate glare. They have a RGB linear input and are also available in RGB/TTL and composite versions.

The standard resolution composite monitors have two inputs, the RGB/TTL and Pal encoded composite signals with separate sound inputs and will cost £265 plus VAT. All the monitors are housed in cabinets with optional carrying handles. A number of other specialist products will follow on from the monitors later in the year.

Contact: Compuser Ltd, 27
Vulcan Way, New Addington,
Croydon, Surrey CR9 0BG. Tel:
0689 46116.

Partners

W H Smith has linked up with Softeam, a major US Software distributor in a bid to capture more than 25% of the UK business software supply over the next three years.

The new partnership, now called WHS Softeam have produced a bi-monthly software catalogue which is displayed in all WH Smith stores. The catalogue costs 75p and contains descriptions of all the software and is aimed at both new and add-on users. Other functions of WHS Softeam include after sales service, advice and supply.

Contact: W H S Softeam,
Warehouse and Distribution,
Euston Street, Freemans Com-
mon, Aylestone Road, Leices-
ter LE2 7SS.

Grafpad

British Micro have plans to release the Grafpad, priced at £125, later this year. The proposed package will contain a cassette and accompanying software programs which will enable you to draw your own designs or trace the outlines of maps and pictures. These can be saved on disk or cassette and copied through a printer.

It has a working area of 240 x 192mm, with a resolution of 320 x 256 pixels. A freehand drawing program, called Draw, accompanies the Grafpad and together with the detachable pen and a choice of red, green or blue, there is scope for a variety of drawings.

Contact: British Micro, Penfold Works, Imperial Way, Watford, Herts WD2 4YY. Tel: 0923 48222.



Data storage

A floppies deskbox from Inmac will store up to 40 5¼ inch floppies in a beige plastic box costing £7.

Dividers keep the disks separate and the snap action lid is hinged so that it drops forward and provides a space for the temporary storage of disks.

Also from Inmac is a print-out binder in which printouts can be filed flat for easier reference. The fixing mechanism is adjustable so that odd sized paper can be accommodated.



Miracle modem

The WS2000 modem for Minor Miracles costs £99.95 and will support communication systems all over the world including the American Bell system.

It conforms to the V21 and V23 CCITT standards and is switchable to the 300 baud full duplex, 1200 half duplex, 1200/75 and 75/1200 (for communication with the Prestel, Viewdata and Micronet ter-

minals).

A plug in Auto-Dial and Auto Answer Board can be bought for £39 and a lead control set for £9.50. It has a RS232C and will need an interface to connect with the Pet, 64 or VIC 20. These can be purchased from the company.

Contact: Minor Miracles Ltd, PO Box 48, Ipswich IP4 2AB. Tel: 0473 50304.

Shortage

Unprecedented demand and a semi conductor shortage have severely affected the availability of Epson's LQ-1500 dot matrix, letter quality printer.

Deliveries to meet the current demands will not be made until late August or September and so in the meantime Epson are supplying the printer by allocation.

Contact: Epson Printers,
Dorland House, 388 High
Road, Wembley, Middlesex
HA9 6UH. Tel: 01-902 8892.

Compile

C P White have produced a Basic Compiler on cassette for the 64. It comes complete with a manual and costs £34.50.

The company claims that any program written in Basic will run 62 times faster if this compiler is used. It will not save the compiler with a machine code program.

Contact: C P White (Services), 54 Northfield Avenue, West Ealing, London W13 1RR.

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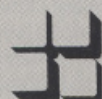
Superbase 64 solves a host of filing problems with its easy record formatting, powerful indexing and sorting, extensive outputting options, and its 'Superbasic' programming capability.

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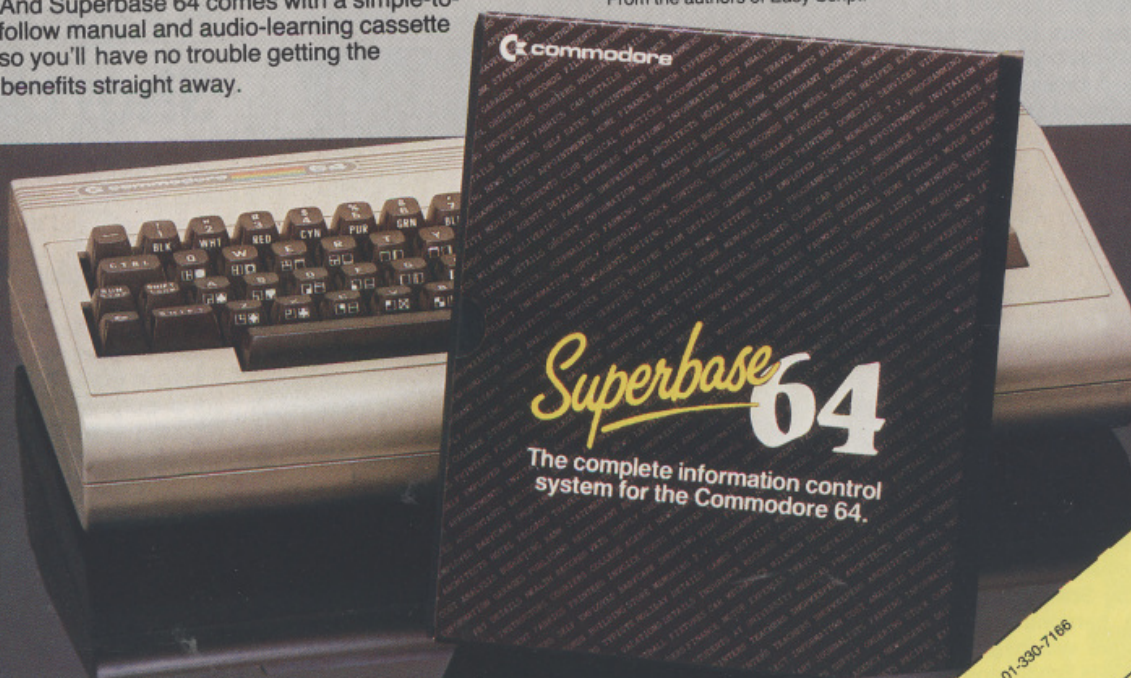
Complete your Commodore 64 – Complete the coupon



Precision Software Ltd.
6 Park Terrace, Worcester Park,
Surrey, KT4 7JZ
Telephone: 01-330 7166
Telex: 8955021 PRECIS G

More information on Superbase 64 is available from Commodore Dealers, Major Retailers or from Precision Software direct.

From the authors of Easy Script.



Precision Software Limited, 6 Park Terrace, Worcester Park, SURREY KT4 7JZ Telephone: 01-330-7166

Please send me more information on Superbase 64.

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Address _____

Occupation _____

I am interested in using Superbase 64 for:

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Business Records ☐ Accounts ☐

Others _____

Tel. _____

Age _____

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Or debit my Access/VISA Card Number _____

CCI 5/84

Signature _____

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All programs are sold subject to the condition that they may not be by way of trade or otherwise be lent, hired out, resold or otherwise circulated without the written permission of Richard Shepherd Software Ltd.

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ONLY
£34.49

(P+P £2.50)

The Rotronics Portable Case

Here is the ideal portable work station for home, school or work. Specially made for most home microcomputers, it contains your VIC 20 or CBM 64 within a smart executive style case with removable lid for convenience in use.

The individually tailored foam insert securely protects your micro and cassette recorder (both types) during

transit. Additional storage space in the lid holds manuals and up to twenty cassettes. A scalpel is provided to modify the insert for expansion units and an alternative insert can be supplied if you change your hardware in the future. The case is also available with uncut foam inserts.

All components remain fully operational within the case via inter-connections

routed between the double layers of foam, so there are no unsightly leads.

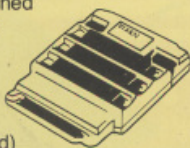
This is the first case designed for easy use with each component positioned for convenient operation. The overall dimensions are 138mm x 700mm x 363mm.

VIXEN RAM Cartridge

Versatile unit with switchable memory blocks. Allows standard 16K BASIC memory expansion, or RAM to be relocated for machine code use. Two VIXENs may be combined (using the Motherboard) and set so as to fully expand the VIC to 32K. £34.45 (p+p 50p)

VIXEN Motherboard

Allows up to four cartridges to share the VIC 20 expansion connector. Switches allow two of these ports to be switched in or out, or to be relocated in memory. The VIXEN also incorporates a socket which accepts software in PROM form: a utility PROM is already available (not supplied) which adds 18 new and useful commands to VIC BASIC. £31.95 (p+p 50p)



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Paint pic

Paintpic, a complete colour drawing and painting program for the 64 is now available from Kuma Computers for £19.50.

Available on cassette, the program can draw in three modes – pen, brush and text and it can draw both curved and straight shapes – circles, arcs and triangles for example. Pen, bristles, borders and background colours can be set. There are a number of selectable features including eight storable brushes, graphics characters and tilted shapes.

Contact: Kuma Computers Ltd, 12 Horseshoe Park, Pangbourne RG8 7JW. Tel: 07357 4335.

Show

Walthamsoft '84, a home computer show, is being held in the main hall of Waltham Forest Technical College, Forest Road, Walthamstow, London E17 on Saturday May 19.

It opens to the public from 10am until 5pm and the admission fee will be £1. Stands exhibiting software, hardware, peripherals and allied electronics will be among the attractions. Walthamstow is easily accessible by public transport and there is ample parking space for cars.

Data 20

The Data 20 interface from Impex connects the 64 or Vic 20 to a parallel printer and costs £54.95.

It will work with printers with programmable character sets and will disable ASCII conversion. Supporting the Commodore handshaking protocol, the interface appears to the system as a 1525 printer. It generates its own power by using a small amount of energy from the signals passing to the printer from the computer.

Contact: Impex Designs (UK) Ltd, Metro House, Second Way, Wembley, Middx. HA9 0TY. Tel: 01-900 0999.

64 centre

Griceglen, a software centre specialising in products for the 64, has opened in London. It is stocking all sorts of items ranging from business applications – accounts, database systems and spreadsheets to programmers aids, books and utilities – games and educational programs.

Product Demonstrations and after sales support for business customers are also available. The centre aims to keep adequate stocks up and currently have over 200 different items.

Contact: Griceglen Ltd, 26 Red Lion Square, London WC1V 4RL. Tel: 01-242 9462.

US supply

The North American division of Precision Software have signed with Commodore to supply Easy Script and Easy Spell as the standard word processing packages for the new 264 and V364 series. At present, these will only be available in North America.

Optional voice synthesis on the V364 means that commands and error messages can be spoken as well as written on the screen. There are also a number of enhancements designed to take advantage of the additional facilities on these models. Easy Spell will also feature more technical words.

Programs

Handic Software have produced a number of programs which they hope will boost the commercial applications of the 64 and also a catalogue listing products available for all of the Commodore Computers.

Among the software produced is the MON 64, a Machine Code Monitor on cartridge and REL 64 which turns the 64 into a remote Command and Control Centre – activating burglar alarms, lamps, telephones, and televisions.

Contact: Handic Software, 5 Albert Road, Crowthorne, Berkshire RG11 7LT. Tel: 0344 778800.

Budgeting

Kuma Computers have at last released a 64 version of Home Budget for £9.95.

Designed to help keep track of home finances, it builds up a file of incomes and expenditures and produces tabulated reports or bar charts on these. It also has a facility to do "what if" calculations. Up to 12 categories of expenditure and three categories of income are defined and all data can be logged for date and time.

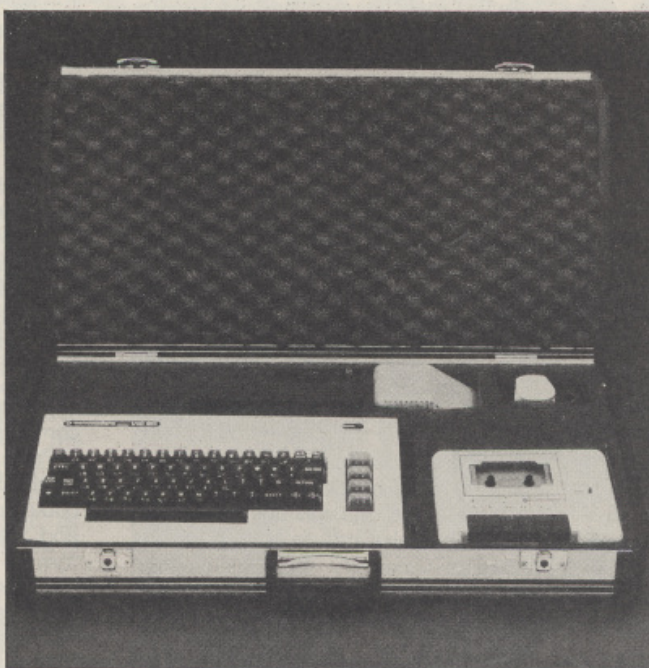
Contact: Kuma Computers, 12 Horseshoe Park, Pangbourne RG6 7JW. Tel: 07357 4335.

Twin pack

BASF are launching a twin pack of disks, providing an alternative to the traditional box of ten.

Four types of 5¼ inch disks will be offered in the new packaging: single and double-sided versions of both double density and quad density flexy-disks. A cross reference chart on the reverse will aid potential buyers to select the right disk.

Contact: BASF, 4 Fitzroy Square, London W1P 6ER. Tel: 01-388 4200.



Hold-all

Ever had problems transporting your 64 or VIC 20 and the various peripherals around the country? If you have, then read on because Rotronics have designed a computer case which will hold everything – the keyboard, cassette recorder, power supply, leads and even the manuals. It retails at £34.49 plus £2.50 p&p.

It weighs about 3.5Kg when

empty and is about 690 x 360 x 140mm in size. Foam inserts protect the equipment, keeping it secure, and the case has black leather-look sides, aluminium extrusions and chrome-plated locks and hinges.

Contact: Rotronics Ltd, 29 Octagon Parade, High Wycombe, Bucks HP11 2HX. Tel: 0494 449623.

Mice, mazes and micros

"Eeek! A mouse!" might not be quite the appropriate response to the mice which will be appearing at the Computer Fair although the 'chips on wheels' bumbling their way round a maze might well produce a puzzled reaction from onlookers. Here, John Billingsley, who might be regarded as the cat's whiskers of the Mouse Movement, looks at the Euromouse competition.

First, a word of explanation for the uninitiated. A micro mouse is basically a mobile chip. It's a machine that's capable of finding its way round a maze by using logic.

The Euromouse contest was first proposed just five years ago – it seems much longer. IEEE Spectrum magazine had launched its Micromouse contest in the USA; could a similar contest be used to lend light relief to the Euromicro conference planned to take place in London in September 1980?

A press announcement brought a deluge of enquiries, and the contest was on. Then the real problems started. Spectrum printed an account of a contest with a simple maze, where dumb wall-followers found the corner exit in record time. Machine intelligence was left standing. How could the Euromouse maze pose a real challenge to 'intelligent' mice?

The answer was to put the target at the centre, and to surround it with a 'moat' of passages, so that a wall-follower would merely arrive back at the start. Just in case this proved too simple, a 'cat hunt' and a 'virtuoso display' were added as extra classes.

A practice heat was organised at Portsmouth Polytechnic for July 1980. As the day approached the mice seemed to have been smitten by a plague. From 20 mice in construction their numbers shrank to ten, then seemed in danger of approaching zero. Frantic telephone calls imploring builders to bring anything that moved succeeded in gathering just five mice for the contest.

The mice were outnumbered by the Japanese delegation researching a contest of their own, and by the television crew bent on filming the marvels of robotics. One mouse was able to navigate a corner, and might

perhaps have found the centre but for a defective sensor. One ricocheted from wall to wall and made progress by Brownian motion. (These were the 'home team' of Portsmouth Polytechnic final year projects). An industrial entrant representing several thousand pounds of effort could only spin on the spot – the result of a last-minute 'improvement' to an interrupt routine. Another 'big league' mouse entertained the audience guided by two switches and an embarrassed builder. A school-built entrant covered all of six inches before its wrongly connected feedback rammed it into the wall.

Despite all this the practice was enormous fun, and the greater the chaos the more the audience and the TV presenter seemed to enjoy it. Nevertheless it was with some trepidation that I looked forward to September!

The Euromicro final was a different matter. Nine mice arrived, all potential contenders for the championship (except one which refused to move). Some sported furry coats, one sang with a raucous voice, one was built from Lego bricks. A Swiss mouse had ingenious wheels of which the 'tyres' were themselves cross-pivoted wheels, allowing the mouse to move in any direction without turning.

A Finnish mouse, Midnight Sun, could play Beatles tunes and write its name. But only one mouse, a modest clattering tin contraption with mechanical paddle sensors, succeeded in reaching the centre knowing that it had arrived there. This was Nick Smith's 'Sterling Mouse', still occasionally to be seen in action to this day.

Following an Easter 'fancy' hosted by ICL's amateur computer club, the 1981 British finals were held at the Online exhibition at Wembley Conference centre. Fifteen mice now arrived from Britain alone. The BBC 'Computer Programme' series has immortalised

Quester's brainless bumbings, and two new mice made their historic debuts. These were Thumper, a square machine which switched the directions of all four wheels to change direction without turning, and Thezeus.

Cardboard and balsa-wood featured largely in Thezeus' construction, with model-aircraft seros proclaiming Alan Dibley's other hobby of model gliding. A sawn-off ZX80 provided computing power, and Thezeus turned by lowering a circular plate to the floor, lifting its wheels and spinning on the spot, meanwhile using cotton strands to hoist in its thin wire sensors.

The mouse builders were a lively bunch, and attached so much attention from visitors to the show that other stands complained of the disturbance – that was the last time the Mice were invited to Online.

September 1981 found fifteen mice competing in the Palais de la Decouverte in Paris, and David Woodfield's Thumper established itself as champion. Mice could now be relied on to find the centre, and the contest was becoming transformed from a puzzle to a race. A 'first' at Paris was the participation of a school team – although their mouse arrived as a kit of parts in a carrier bag, and did not exactly cover itself in glory.

In 1982, Practical Computing's 'Computer Fair' at Earls Court played host to the mice for the British Final. Two new Thezeii arrived, to relegate Thumper to third place, whilst several promising novices made an appearance. The planned European final was to be held at the Euromicro conference in Haifa, but affairs in the Lebanon changed all that. Tampere University in Finland stepped in as hosts in the nick of time – and then won first place with Microsaurus by a margin of two seconds.

1983 became the year of the school teams. They didn't win – by a long chalk

PROJECT

— but their performance at the Computer fair won them sponsorship to take part in the finals in Madrid. The top mice were taking on a new shape. Steered tricycles emulating an earlier Thezeus, they concentrated on clearing corners without faltering, and the winning mouse reached the centre in just over thirty seconds. Again the winner was a Finn from Tampere.

This year's heats will again be held at the Computer Fair, the start of a trail which could lead to Japan. T5 should be unveiled by Alan Dibley, and David Woodfield threatens a successor to KnownAim, in turn much faster than Thumper. Hopefully the winner will be sponsored to the Euromicro Final in Copenhagen in August, where the European winner has been promised an

expenses-paid trip to compete in Japan in 1985.

Nick Smith's original 1980 algorithm for solving the maze still holds good today, and the challenge is more one of good engineering, reliability and tolerance to disturbances than one of conundrum solving. It is a challenge which will hold good for many years to come, perhaps with an increasing schools participation. So what sort of contest can baffle the experts?

Next year will see the introduction of a Robot Ping-Pong contest. It's not as impossible as it sounds. The table is two metres long, but only half a metre wide, so the bat movement is restricted to a reasonable range. The ball must bounce once and leave the table through a frame half a metre square, so lobs and slams

are kept in check.

The ball is served automatically from a position in full view above the net, so the vision task is only one of tracking, not of spotting the ball. The net is quarter of a metre high, slowing down the game to a third of a second or so for the journey down the table, and at 12.5 cm diameter the bat covers a substantial part of the playing frame area. I don't say that the contest will be easy, but several teams are well under way with their construction.

The first aspect of the contest is a race to claim the best names — CY Borg and Machineroe have already been christened. If you would like to compete in Mouse or Ping-Pong contest, please contact me at Portsmouth Polytechnic Department of Electrical Engineering, Anglesea Road, Portsmouth PO1 3DJ.

Build a robot mouse

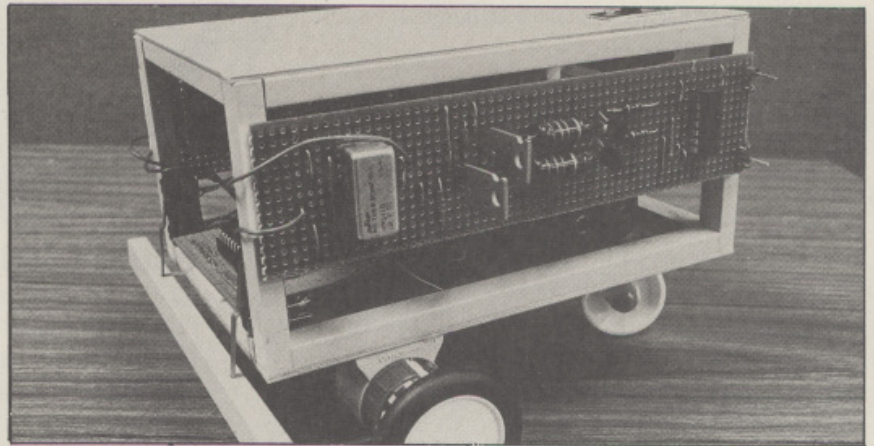
The first part in a series on the circuitry and software required to control a robot

The idea of building a computer controlled robot is very appealing. What usually stops people constructing such machines is the design and construction of the hardware. Building robots requires a range of different skills: computing for the control software, electronics for the control hardware and mechanical construction to build the mechanical base of the machine. To simplify these problems the robot design should be kept as basic as possible. The simplest form of robot is the mobile or "turtle" robot.

A turtle robot has a very simple mechanical base and consists of a rectangular perspex plate to the front end of which are attached two small five volt DC motors. These motors directly drive small model airplane wheels. In the centre of the rear end of the plastic base plate is a small furniture castor.

The construction is very simple and for the "turtle" shown on the front cover of this magazine all the mechanical parts were bought from a model shop for just a few pounds (except the castor which came from a hardware store). Construction tools were confined to a sharp knife, a small hacksaw, a ruler, and plastic cement.

Having constructed a mechanical



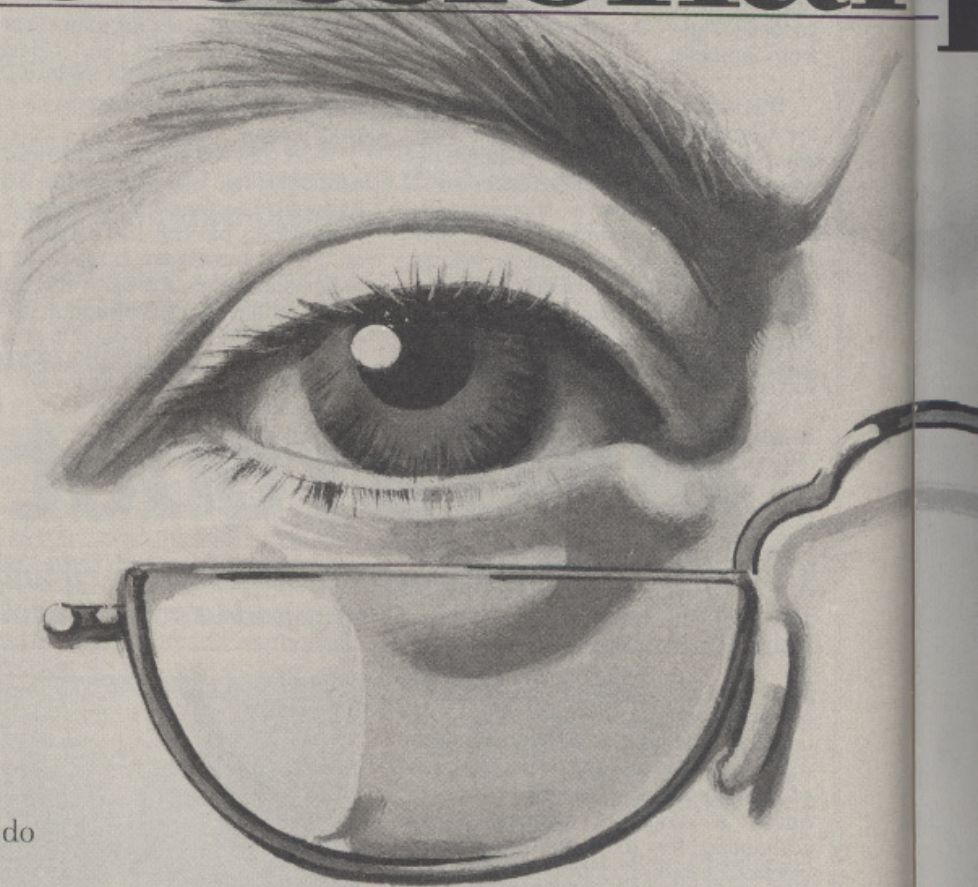
base, the next stage is to build the motor drive electronics. These are relatively simple to construct and the dedicated experimenter will find the circuits useful for controlling a whole range of power devices.

The simplest and cheapest type of robot motors are the small, low-voltage DC motors sold in model shops. Such motors usually run on five or six volts at 750 milliamps and can thus be conveniently powered by a rechargeable battery onboard the robot. The usual cost of such motors is £2. For about £10 you can hire small DC motors with

integral gear boxes which are preferable for robots.

Two controls are required for a DC motor — speed and direction. Speed can be controlled by changing the supply voltage, and direction of rotation by switching the polarity of the motor power supply. In order to perform both these functions we need a simple switch circuit which will allow the computer to control the DC load in a small motor. Additional circuitry is also required to protect the computer if high voltages are used.

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Practifile 64. The database for Commodore 64.

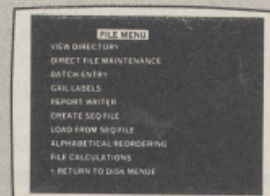
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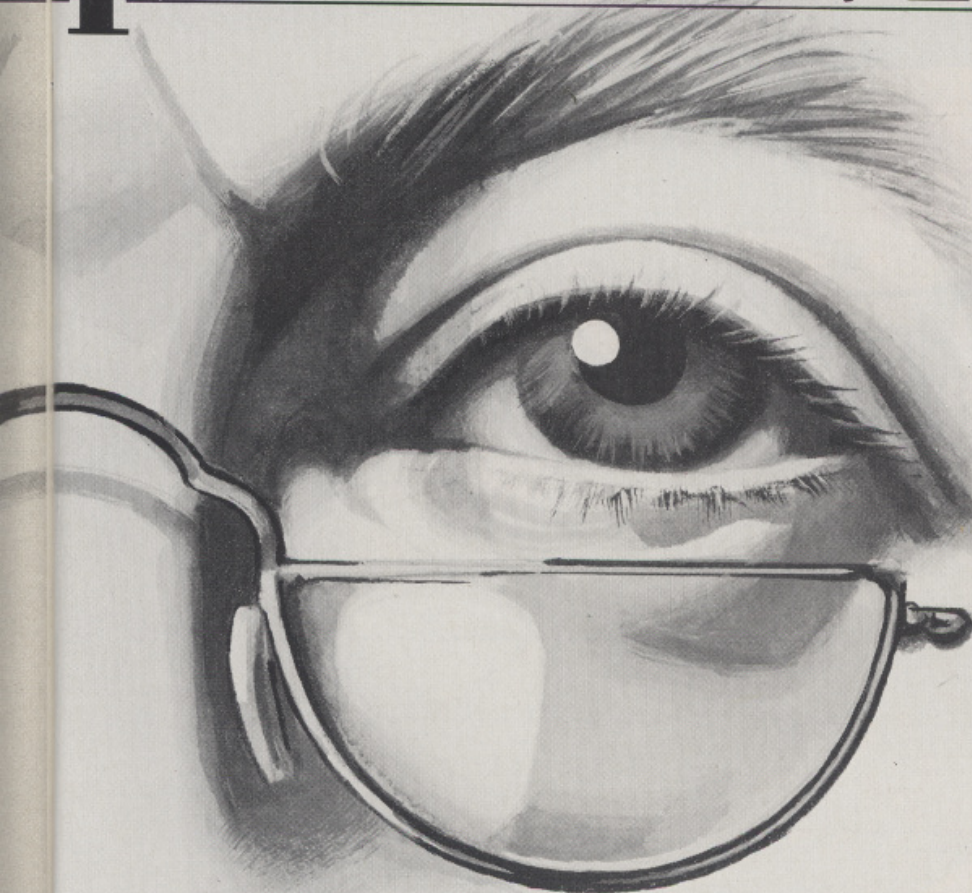
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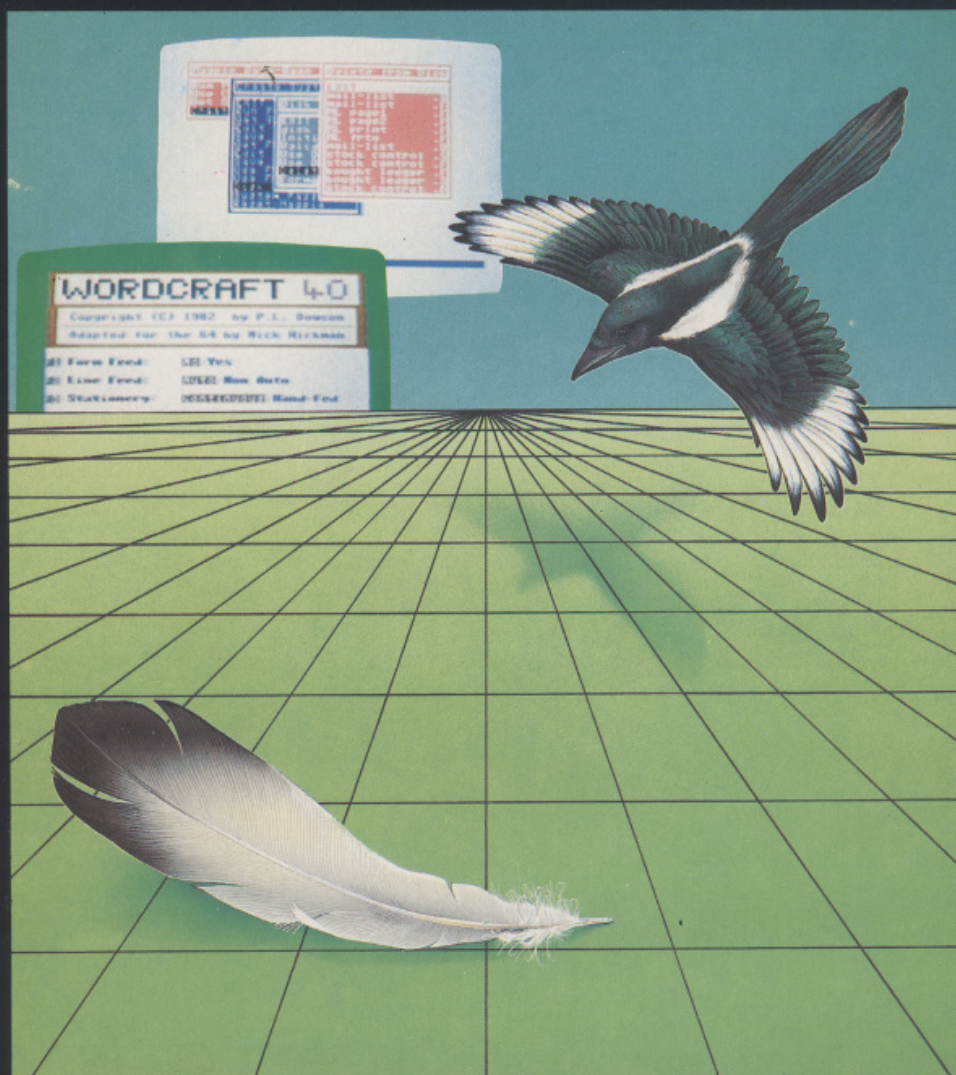
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PROJECT

A basic circuit configuration for switching small DC loads is shown in Fig. 1. These loads can range from five to 25 volts with current consumption of several amps. Such a circuit can be used not only for controlling DC motors but also relays, solenoids, lamps and stepper motors and is therefore an invaluable basic circuit for the experiment. This circuit is, of course, not the only way of performing this function – solid state relays offer an excellent method with the benefits of opto-isolation, ease of driving by a computer I/O port and both fairly high load switching and response frequency. They are however still fairly expensive.

The basic operation of the circuit is quite simple. When the output of the 7400 inverting gate rises, the emitter of transistor T1 rises to the same voltage as its base. Current then flows through the circuit limiting resistor R2 and T1 into the base of T2. While the base of T2 is held more than 0.8 volts above its emitter, the device will conduct. Current can then flow through the load. When the output of the 7400 drops to logic 0, then the emitter of T1 also falls to a low voltage level and T2 ceases to conduct.

The power transistor used in this circuit T1A 41A has the disadvantage of a low current gain. This means that if it is to pass a large current through its load then T1 must supply a smaller, but still high current to its base. The resistor R2 is placed in the circuit to prevent excessive current flowing through T1. If the TIP 41A is used then the load should not be more than one amp. For large loads the 2N 3055 can be used to replace the TIP 41A and the value of R2 can now be reduced to 10 ohms. Since this transistor has a higher current gain, current loads of several amps can now be switched.

It should be added that many devices with inductive loads, such as motors and relays, produce spikes of back emf. These could damage the circuit components, and therefore diode D1 is included to protect against this.

To control a small DC motor, two of these circuits were built on a single PC board and the inputs to the 7400 connected to two output lines of the computer. One of the circuits is used to energise the coil of a double pole changeover relay, the function of which is to reverse the motor's polarity and therefore its direction of rotation.

The method of connection is shown in figure 2 – this is the complete motor

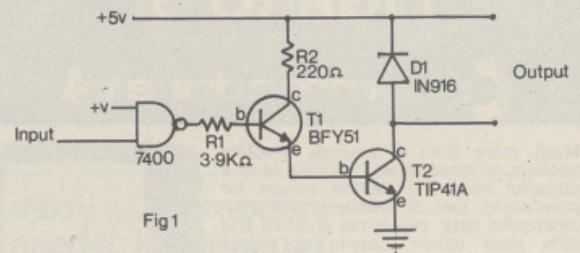


Fig 1

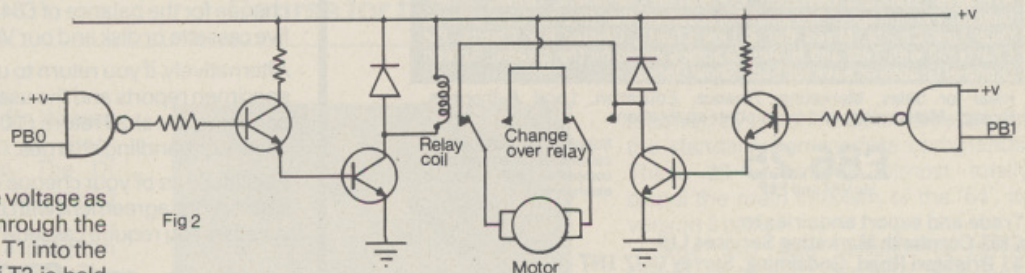


Fig 2

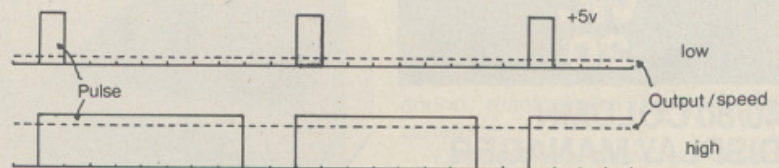


Fig 3

control circuit. The second circuit controls the power supply to the motor, switching it on or off. The motor can now be directly controlled by the computer via the connections between the circuits and the I/O ports.

Since these currents only switch the motor on and off, the motor's speed is controlled by a technique known as pulse-width modulation. Here the motor is turned on for a period and then off. The ratio of on and off times determines the speed of rotation. If these time periods are very small then the mechanical inertia within the motor will cause the pulses to be smoothed out and the consequential integration gives a varying motor supply voltage and therefore speed. This is diagrammatically shown in figure 3. A program to control the speed of a DC motor is shown in figure 4.

```

0  C000  A940  LDA  #40
1  C002  8D03DD STA  $DD03
2  C005  A200  LDX  #00
3  C007  8E01DD STX  $DD01
4  C00A  E8    INX
5  C00B  E4FB  CPX  #FB
6  C00D  D0FB  BNE  #C00A
7  C00F  A940  LDA  #40
8  C011  8D01DD STA  $DD01
9  C014  E8    INX
10 C015  D0FD  BNE  #C014
11 C017  A5C5  LDA  #C5
12 C019  C940  CMP  #40
13 C01B  F0E9  BEQ  #C005
14 C01D  60    RTS
READY.

10 SYS49152
20 SETA$
30 POKE251,VAL(A$)*25+1
40 WAIT197/64:POKE198,0:COTO10
READY.

```

Fig 4

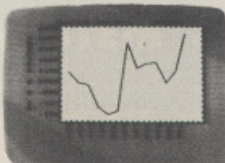
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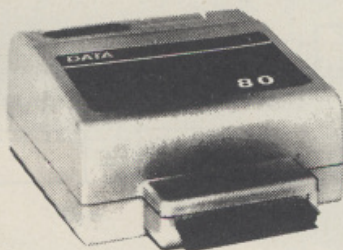
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PLAN MANAGER was designed to be easy to use and very fast for users who require a spreadsheet for their home and business applications.

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Elementary Watson

No-one could possibly expect to buy a Commodore computer and find out all they need to know about computing from the manuals provided. Unfortunately much of the other material that's available takes you no further than the manuals. There are exceptions, of course, and one of these is Dr Watson's Beginners Basic Course for the 64.

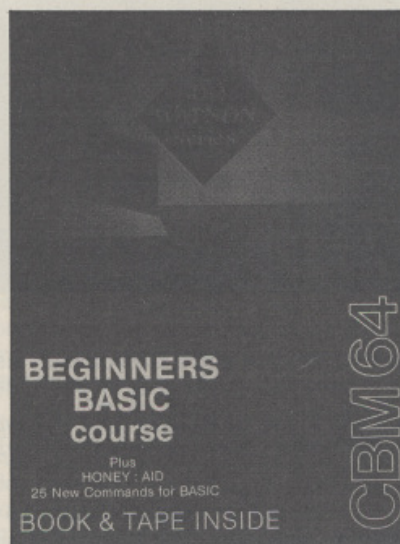
This is one of the range of Dr Watson tutorial packages consisting of programs and written material. The Dr Watson series is rapidly becoming recognised as quality material.

This course consists of a program tape and a 300 plus page book. The whole package is excellently presented in a hardwearing plastic cover. The manual starts off with a guided tour of the keyboard and finishes with a brief introduction to machine code, covering almost everything else along the way.

Realising that most newcomers to computers play games, seven games are provided on tape. Although none of these would warrant a CCI star rating, they have each been carefully chosen, and written, to demonstrate various capabilities of the 64 and particular programming techniques. After the initial chapter, the listings for these games are used to show how programs are built up and new commands are introduced and explained both with written text, and small example programs. Interspersed throughout the book are exercises to ensure that you really are understanding each new command or technique, but at no stage do these become 'hard work', in fact the course consistently encourages you to learn more and more by making learning fun.

The two authors, P Holmes and D J Bush have obviously taken a great deal of time to produce a well thought out tutorial, and if this was the total content of the course, it would prove excellent value. However there is more . . . much more.

Side two of the cassette contains 'HONEYAID', a collection of no less than



28 additional basic commands in a 4K machine code program. Once loaded these commands sit 'above' basic, and allow many features of the '64' to be explored effortlessly. The commands are split into three broad sections, Toolkit commands, and supplementary Graphic and Sound commands. Among the 15 Toolkit commands are Append, Auto (line numbering), Delete, Old and (Re)Number, and these soon become invaluable when writing your own programs. The five Graphic and seven Sound commands make it almost possible to eliminate all those thousands of POKE commands that seem to make up the bulk of any 64 program. All commands are 'tokenised' and can be reduced to the first one or two letters

followed by the shifted next letter as per the standard Commodore commands. These 28 commands almost totally dispel the main criticism of the '64', its version 2 basic.

Side two also contains a clever 'Computer Aided Learning Program', 'guess the number'. After allowing you to play this simple game, the program then explains itself to you line by line and command by command, and graphically demonstrates some of the more familiar commands and concepts of programming such as the For . . . Next loop and comparative operators (< >). And still there is more. A Character editor, a Sprite editor and a marvellous sound manipulation program Composatune.

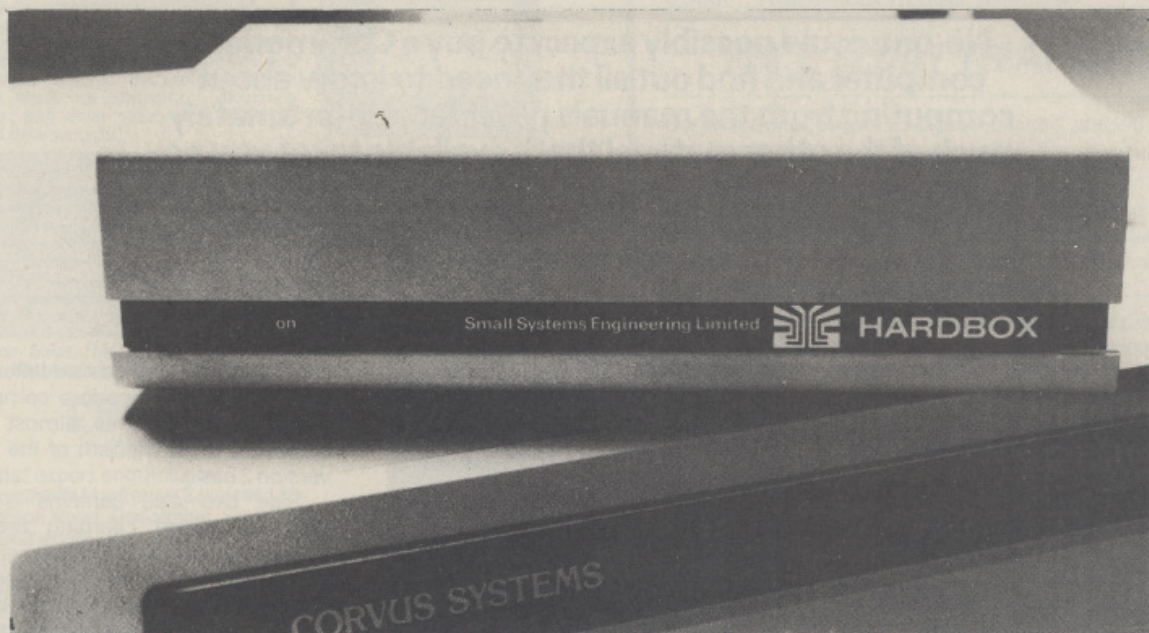
Composatune allows you to compose melodies note by note on a musical stave and save these for later use in your own program, it also incorporates a useful sound synthesizer subroutine which allows you to alter the sound of each note whilst hearing what you are doing and seeing which values are being poked into which locations. Unless you have a PHD in music, this is the easiest way to discover the effects of Attack, Delay and rest of those strange words referred to in the Commodore manual.

As with the games, these last three programmes are all explained line by line in the manual, and themselves form the latter part of the course.

If the remainder of The Dr. Watson computer learning series match the standard of this, then not only Commodore, but many other computer manufacturers have been shown how an introductory manual should be written.

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NOW AVAILABLE WITH
SOFTWARE-CONTROLLED
OVERNIGHT VIDEO
BACK-UP



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Hardware Requirements

- Commodore 3000, 4000, or 8000 series computer with BASIC 2 or 4.
- One HARDBOX and PET-IEEE cable per work station.
- Corvus bare drive and ribbon cable.
- Access to a floppy disk or cassette.

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Versatile plotter

This month we look at Micro Peripherals MCP-40, a four-colour printer/plotter

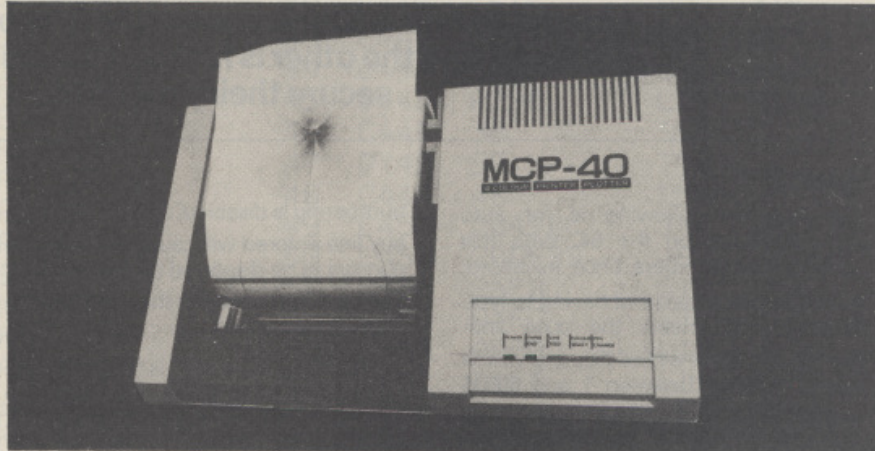
One of the most pleasing things about the MCP-40, besides its extremely versatile plotting abilities, quality print and four colours is that it was so easy to use. Unfortunately, to connect it to the 64 an interface is needed – either a Commodore serial to Centronics or a Commodore user port to Centronics.

The panel on the front of the plotter contains controls to select a colour, move the paper or change a pen. It also indicates if the power is on or if the paper has run out. The pens, which look rather like biros, are fitted into a holder and rotated by the plotter itself. Graphics and text are drawn on a roll of paper about 4.5 inches wide. The pen holder is a delicate mechanism, but the panel controls can be used to change any pen minimising unnecessary handling.

There are two modes of operation; the Text mode for word processing, writing text and programs and the Graphic Mode for generating graphs, pie charts and other pictures which need to be plotted. It should be noted here that it will not reproduce Commodore Graphic characters in listings, but it wouldn't be too difficult to write a driver program to actually draw the characters on the paper itself. There is also a self test mode in which four boxes are drawn, one in each colour so that the user can check that they are all working.

Micro Peripherals have programmed the plotter to understand certain commands and these are clearly explained in the manual together with an example showing how each one can be used in a program. To vary the print size in Text mode, the DIP switch can be set at either 80 or 40 characters per line. There is no problem switching to graphics mode and text mode in the program so if a diagram needs to be accompanied by an explanation this is quite straightforward. Anyone with some knowledge of BASIC and the CBM 64 would have no trouble in producing some very interesting and versatile pictures or diagrams using the commands available.

The plotter can print backwards, upwards, upside down and with the 63 different sizes of text, four colours and



seemingly endless Y co-ordinates, the users imagination and curiosity will be rewarded with spectacular displays. The paper is friction fed and can be made to move backwards as well as forwards providing extra versatility.

The Plotter always knows what colour pen it is using and will usually start with black unless programmed to do otherwise. The initials that are used to control the plotting functions are straightforward. For instance 'C' is used to change the pen colour and the Green is '2', so to change the pen to green in the program, 'C2' is typed in. 'D' stands for destination and specifies the end point that the pen must go to, 'Q' represents direction and the user can specify what direction the printing goes in. The paper

is 480 steps across and 999 steps downwards so it can plot and print very accurately.

There are some sample programs in the manual which demonstrate the plotting and printing capabilities of the printer. There is also a table listing all the characters the printer will print together with the ASCII and JIS code which will print them.

The MCP-40 is surprisingly small when its capabilities are considered and operates with very little noise. Small businesses may find it useful, but they would have to write their own programs. Any 64 enthusiast would probably find a use for this printer/plotter and its price, which is low for what it can do, puts it within reach of a lot of people.

Product Name:

MCP-40

Product:

4-colour printer/plotter

Company:

Micro Peripherals Ltd, 69 The Street, Basing, Basingstoke, Hants RG24 0BX

Specifications:

4 pens: red, green, black and blue

Paper roll 4.25 in wide x 180 ft long

Plotting speed: 2.05 ips horizontal

3.80 ips vertical

Printing speed: 12cps

Resolution: 0.00787 inch

Plotting range: 3.804 inch X axis –

Divided into 480 steps, no limit in Y axis

80 or 40 characters per line

Pen life is 250m

8-bit parallel interface

3 Modes: Self Test, Text and Graphics

Size:

276mm wide x 174mm deep x 68mm high

Applications:

Plotting and printing in four different colours

Documentation:

Very detailed and clearly worded manual with sample plotting and printing programs

Price:

£129 + VAT

Auto solutions

This month we have two machine code routines. One is for the 64 and is the next instalment in our Basic Aid routines, and the other is for VIC owners who wish to secure their programs.

Basic Aid

The program following is for auto line-numbering on the 64. With this routine, line numbers once initialised, will be displayed without having to type them in. To enable the auto line-numbering, enter SYS50156, step where step is a value between 1 and 65535 (usually something like 10). Until the line

numbering is disabled, using SYS50156, any line entered will cause the next line number to be displayed on the next line. The next line number is the previous one with the step added.

All that is done is that if line numbering is enabled, the next line number is put into the keyboard buffer.

Therefore to exit the facility, just press SHIFT RETURN or delete to the beginning of the line. The other way to exit is to press return on a blank line. The latter method, however, will still delete that line.

Like all the other routines, the locations that this routine take up do not conflict with others in the Basic Aids.

```
10 I=50156:T=0
20 READA:IFA=-1THEN50
30 POKEI,A:I=I+1
40 T=T+A:GOTO20
50 IFT<>14298THENPRINT"CHECKSUM ERROR:"14298,T
60 PRINT"USE SYS50156,STEP TO ENABLE AUTO LINE
70 PRINT"USE SYS50156 TO DISABLE NUMBERING."
80 PRINT"END"
100 DATA32,121,0,240,27,32,253
110 DATA174,32,107,169,165,20,141
120 DATA23,196,165,21,141,24,196
130 DATA169,25,141,4,3,169,196
140 DATA141,5,3,96,169,124,141
150 DATA4,3,169,165,141,5,3
160 DATA96,0,0,173,0,2,201
170 DATA48,144,10,201,58,176,6
180 DATA169,1,133,2,208,4,169
190 DATA0,133,2,32,124,165,165
200 DATA2,208,1,96,192,5,208
210 DATA1,96,173,23,196,24,101
220 DATA20,170,173,24,196,101,21
230 DATA134,99,133,98,162,144,56
240 DATA152,72,32,73,188,32,223
250 DATA189,133,251,132,252,160,0
260 DATA177,251,240,6,153,119,2
270 DATA200,208,246,200,169,32,153
280 DATA119,2,132,198,104,168,96
290 DATA-1
READY.
```

NUMBERING.

HINTS AND TIPS

0	C3EC	207900	JSR	\$0079	33	C435	60	RTS
1	C3EF	F01B	BEQ	\$C40C	34	C436	C005	CPY
2	C3F1	20FDAE	JSR	\$AEFD	35	C438	D001	BNE
3	C3F4	206BA9	JSR	\$A96B	36	C43A	60	RTS
4	C3F7	A514	LDA	\$14	37	C43B	AD17C4	LDA
5	C3F9	8D17C4	STA	\$C417	38	C43E	18	CLC
6	C3FC	A515	LDA	\$15	39	C43F	6514	ADC
7	C3FE	8D18C4	STA	\$C418	40	C441	AA	TAX
8	C401	A919	LDA	##19	41	C442	AD18C4	LDA
9	C403	8D0403	STA	\$0304	42	C445	6515	ADC
10	C406	A9C4	LDA	##C4	43	C447	8663	STX
11	C408	8D0503	STA	\$0305	44	C449	8562	STA
12	C40B	60	RTS		45	C44B	A290	LDX
13	C40C	A97C	LDA	##7C	46	C44D	38	SEC
14	C40E	8D0403	STA	\$0304	47	C44E	98	TYA
15	C411	A9A5	LDA	##A5	48	C44F	48	PHA
16	C413	8D0503	STA	\$0305	49	C450	2049BC	JSR
17	C416	60	RTS		50	C453	20DFBD	JSR
18	C417	00	BRK		51	C456	85FB	STA
19	C418	00	BRK		52	C458	84FC	STY
20	C419	AD0002	LDA	\$0200	53	C45A	A000	LDY
21	C41C	C930	CMP	##30	54	C45C	B1FB	LDA
22	C41E	900A	BCC	\$C42A	55	C45E	F006	BEQ
23	C420	C93A	CMP	##3A	56	C460	997702	STA
24	C422	B006	BCS	\$C42A	57	C463	C8	INY
25	C424	A901	LDA	##01	58	C464	D0F6	BNE
26	C426	8502	STA	\$02	59	C466	C8	INY
27	C428	D004	BNE	\$C42E	60	C467	A920	LDA
28	C42A	A900	LDA	##00	61	C469	997702	STA
29	C42C	8502	STA	\$02	62	C46C	84C6	STY
30	C42E	207CA5	JSR	\$A57C	63	C46E	68	PLA
31	C431	A502	LDA	\$02	64	C46F	A8	TAY
32	C433	D001	BNE	\$C436	65	C470	60	RTS

READY.

Auto-Run

Last month we published a routine that would save a Basic program on the 64 with auto-run. In response to that article, one of our readers asked if we could do anything for VIC owners. Well, here it is—an auto-run routine for the VIC.

When run, the routine will be put at the top of memory and it will be protected. 256 bytes are reserved but the routine will work on any expansion of VIC. The problem is that if it is saved with 8K or more expansion, it will only load

back in to computers with that expansion and vice-versa.

Also with the auto-run, the screen is cleared and RUN/STOP-RESTORE is disabled as outlined in last month's issue.

```

10 POKE56,PEEK(56)-1:POKE52,PEEK(52)-1
20 I=PEEK(55)+PEEK(56)*256:T=0
30 READA:IFA=-1THEN60
40 POKEI,A:I=I+1
50 T=T+A:GOTO30
60 IFT<>20661THENPRINT"CHECKSUM ERROR":END
70 PRINT"JTO SAVE WITH AUTO-RUN,ENTER:"
80 PRINT"SYS"PEEK(55)+PEEK(56)*256:CHR$(34)"FILENAME"CHR$(34)
90 END

```


commodore

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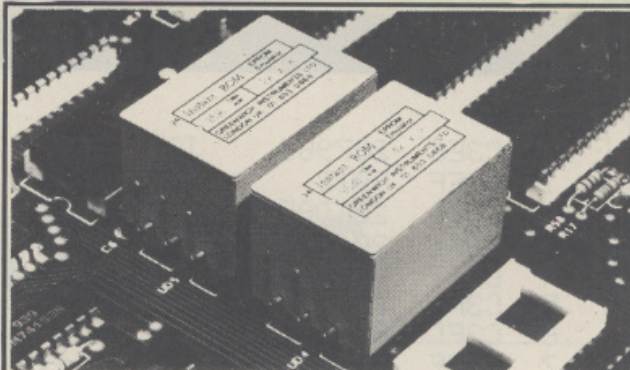
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DTL COMPILER (CBM 2000/3000/4000/8000)	£90.50	£94.78
COMMAND-0 39 toolkit commands (CBM 4000/8000)		£50.00
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VIZASPELL 64 disk dictionary/spelling checker	£50.50	£51.30
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Postage (£1.00) and VAT are extra. Leaflets are available.

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HINTS AND TIPS

```

100 DATA165,43,133,251,165,44,133
110 DATA252,169,189,133,43,141,2
120 DATA3,169,2,133,44,141,3
130 DATA3,165,45,133,253,165,46
140 DATA133,254,169,3,133,46,169
150 DATA4,133,45,160,167,177,55
160 DATA153,88,2,136,192,100,200
170 DATA246,32,209,225,169,3,133
180 DATA185,32,86,225,165,251,133
190 DATA43,165,252,133,44,165,253
200 DATA133,45,165,254,133,46,169
210 DATA131,141,2,3,169,196,141
220 DATA3,3,169,1,170,168,32
230 DATA186,255,169,0,32,189,255
240 DATA76,86,225,169,196,141,3
250 DATA3,169,131,141,2,3,169
260 DATA147,32,210,255,169,126,141
270 DATA40,3,169,0,133,157,32
280 DATA213,255,169,1,170,168,32
290 DATA186,255,169,0,170,168,32
300 DATA189,255,32,213,255,134,45
310 DATA134,47,134,49,132,46,132
320 DATA48,132,50,169,0,32,94
330 DATA198,32,142,198,76,174,199,-1
READY.

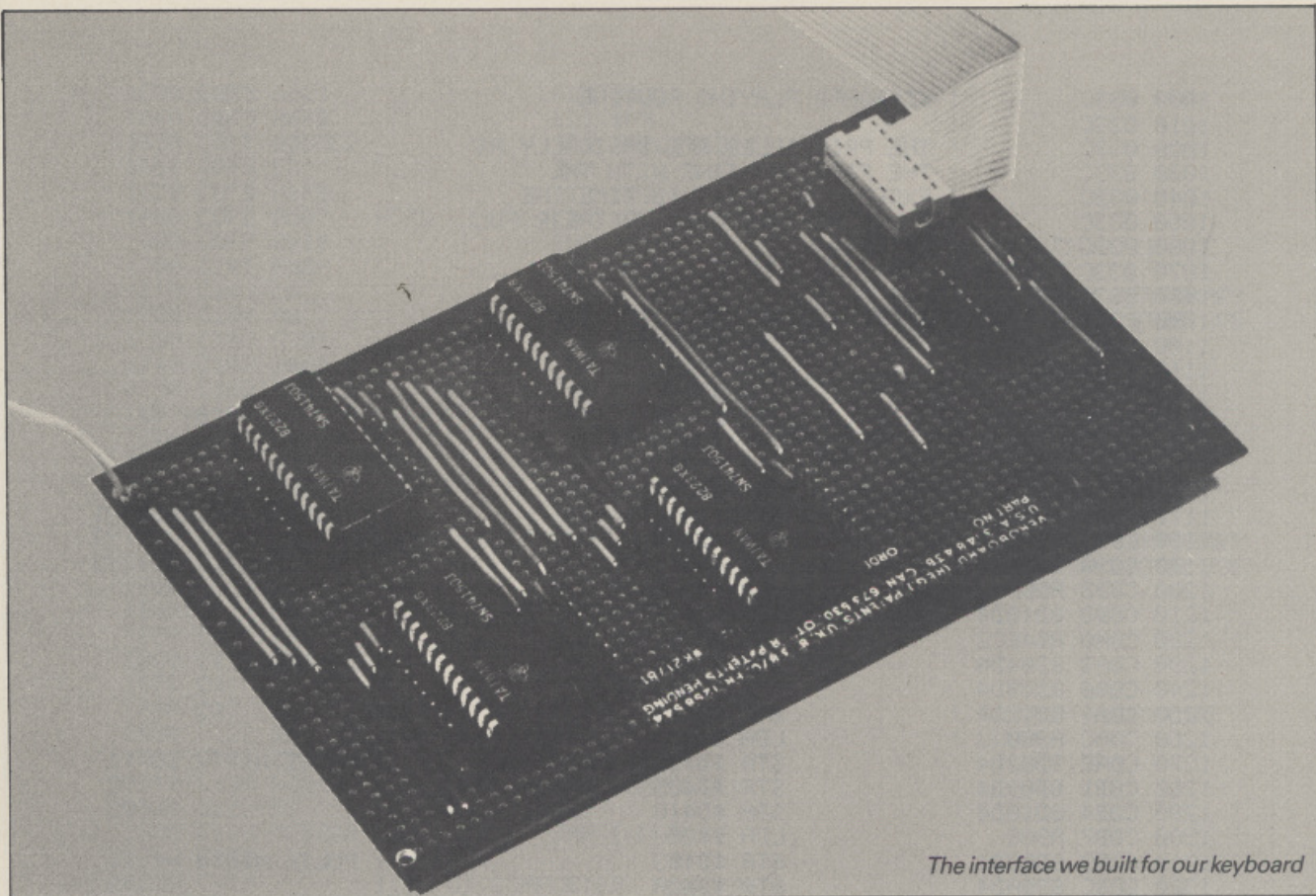
```

CURSOR CHARACTERS

␣	- By pressing the cursor down key	
␣	- By pressing the cursor down key with the shift key	
␣	- By pressing the cursor right key	
␣	- By pressing the cursor right key with the shift key	
␣	- By pressing the home key	
␣	- By pressing the home key with the shift key	
␣	- By pressing the control key and key 1	
␣	- By pressing the control key and key 2	
␣	- By pressing the control key and key 3	
␣	- By pressing the control key and key 4	
␣	- By pressing the control key and key 5	
␣	- By pressing the control key and key 6	
␣	- By pressing the control key and key 7	
␣	- By pressing the control key and key 8	
␣	- By pressing the CBM key with key 1	
␣	- By pressing the CBM key with key 2	
␣	- By pressing the CBM key with key 3	
␣	- By pressing the CBM key with key 4	
␣	- By pressing the CBM key with key 5	
␣	- By pressing the CBM key with key 6	
␣	- By pressing the CBM key with key 7	
␣	- By pressing the CBM key with key 8	
␣	- By pressing the control key and key 9	
␣	- By pressing the control key and key 0	
␣	- By pressing key F1	
␣	- By pressing key F2	
␣	- By pressing key F3	
␣	- By pressing key F4	
␣	- By pressing key F5	
␣	- By pressing key F6	
␣	- By pressing key F7	
␣	- By pressing key F8	

26 Commodore Computing May 1984

MUSIC



The interface we built for our keyboard

```

370 DATA10,212,141,17,212,120,169
380 DATA207,141,20,3,169,192,141
390 DATA21,3,88,96,160,0,132
400 DATA251,140,1,221,173,1,221
410 DATA133,2,41,32,240,12,24
420 DATA152,105,17,166,251,157,85
430 DATA194,232,134,251,165,2,41
440 DATA64,240,12,24,152,105,33
450 DATA166,251,157,85,194,232,134
460 DATA251,165,2,41,16,240,12
470 DATA24,152,105,1,166,251,157
480 DATA85,194,232,134,251,165,2
490 DATA41,128,240,12,24,152,105
500 DATA49,166,251,157,85,194,232
510 DATA134,251,200,152,41,15,240
520 DATA4,168,76,211,192,166,251
530 DATA224,3,176,8,169,0,157
540 DATA85,194,232,208,244,134,251
550 DATA160,0,185,85,194,240,5
560 DATA205,79,194,240,13,200,196
570 DATA251,208,241,169,0,141,82
580 DATA194,76,94,193,169,1,141
590 DATA82,194,169,0,153,85,194
600 DATA160,0,185,85,194,240,5
610 DATA205,80,194,240,13,200,196
620 DATA251,208,241,169,0,141,83
630 DATA194,76,129,193,169,1,141
640 DATA83,194,169,0,153,85,194
650 DATA160,0,185,85,194,240,5
660 DATA205,81,194,240,13,200,196

```

```

670 DATA251,208,241,169,0,141,84
680 DATA194,76,164,193,169,1,141
690 DATA84,194,169,0,153,85,194
700 DATA173,82,194,208,43,32,55
710 DATA194,205,79,194,240,35,141
720 DATA79,194,10,168,173,78,194
730 DATA141,4,212,173,79,194,240
740 DATA19,185,0,192,141,0,212
750 DATA185,1,192,141,1,212,174
760 DATA78,194,232,142,4,212,173
770 DATA83,194,208,43,32,55,194
780 DATA205,80,194,240,35,141,80
790 DATA194,10,168,173,78,194,141
800 DATA11,212,173,80,194,240,19
810 DATA185,0,192,141,7,212,185
820 DATA1,192,141,8,212,174,78
830 DATA194,232,142,11,212,173,84
840 DATA194,208,43,32,55,194,205
850 DATA81,194,240,35,141,81,194
860 DATA10,168,173,78,194,141,18
870 DATA212,173,81,194,240,19,185
880 DATA0,192,141,14,212,185,1
890 DATA192,141,15,212,174,78,194
900 DATA232,142,18,212,76,49,234
910 DATA160,0,185,85,194,240,8
920 DATA72,169,0,153,85,194,184
930 DATA96,200,196,251,208,238,169
940 DATA0,96,16,0,0,0,0
950 DATA0,0,0,-1
READY.

```


MUSIC

```

1000 033C      ! KEYBOARD PLAYING ROUTINE
1010 033C
1020 033C      ! THE PRINCIPLES ARE BASICALLY AS
1030 033C      ! THE FIRST ROUTINE WITH THE
1040 033C      ! EXCEPTION THAT THIS TIME THE
1050 033C      ! ENVELOPES ARE USED TO THEIR FULL
1060 033C      ! EXTENT.
1070 033C
1080 033C
1090 C080      *=$C080 ! START OF CODE
1100 C080 A90F      LDA #$0F
1110 C082 8D03DD      STA $DD03      ! D.D.R.
1120 C085 A909      LDA #$09
1130 C087 8D05D4      STA $D405      ! ATTACK/DECAY V1
1140 C08A 8D0CD4      STA $D40C      ! V2
1150 C08D 8D13D4      STA $D413      ! V3
1160 C090 A900      LDA #$00
1170 C092 8D06D4      STA $D406      ! SUSTAIN/RELEASE V1
1180 C095 8D0DD4      STA $D40D      ! V2
1190 C098 8D14D4      STA $D414      ! V3
1200 C09B A90F      LDA #$0F
1210 C09D 8D18D4      STA $D418      ! VOLUME
1220 C0A0 AD4EC2      LDA WAVE
1230 C0A3 8D04D4      STA $D404      ! WAVEFORM V1
1240 C0A6 8D0BD4      STA $D40B      ! V2
1250 C0A9 8D12D4      STA $D412      ! V3
1260 C0AC A900      LDA #$00
1270 C0AE 8D02D4      STA $D402      ! PULSE WIDTH LO V1
1280 C0B1 8D09D4      STA $D409      ! V2
1290 C0B4 8D10D4      STA $D410      ! V3
1300 C0B7 A908      LDA #$08
1310 C0B9 8D03D4      STA $D403      ! PULSE WIDTH HI V1
1320 C0BC 8D0AD4      STA $D40A      ! V2
1330 C0BF 8D11D4      STA $D411      ! V3
1340 C0C2 78          SEI
1350 C0C3 A9CF      LDA #<TESTER
1360 C0C5 8D1403      STA $0314      ! PUT CODE INTO
1370 C0C8 A9C0      LDA #>TESTER      ! IRQ
1380 C0CA 8D1503      STA $0315
1390 C0CD 58          CLI
1400 C0CE 60          RTS
1410 C0CF
1420 C0CF      ! START OF KEYBOARD ROUTINE
1430 C0CF
1440 C0CF A000      ! TESTER      LDY #$00      ! INITIALISE LOOP
1450 C0D1 84FB      STY $FB      ! NUMBER OF KEYS READ
1460 C0D3 8C01DD      INPUT      STY $DD01      ! SEND TO USER PORT
1470 C0D6 AD01DD      LDA $DD01      ! READ USER PORT
1480 C0D9 8502      STA $02
1490 C0DB 2920      AND #$20      ! TEST CHIP 2
1500 C0DD F00C      BEQ NOT1      ! NOTHING
1510 C0DF 48          CLC      ! STORE IN TEMPORARY
1520 C0E0 98          TYA      ! AREA FOR LATER USE
1530 C0E1 6911      ADC #$11
1540 C0E3 A6FB      LDX $FB
1550 C0E5 9D55C2      STA INPUTTED,X
1560 C0E8 E8          INX
1570 C0E9 86FB      STX $FB
1580 C0EB A502      ! NOT1      LDA $02
1590 C0ED 2940      AND #$40      ! TEST CHIP 3
1600 C0EF F00C      BEQ NOT2      ! NOTHING
1610 C0F1 18          CLC      ! STORE IN TEMPORARY
1620 C0F2 98          TYA      ! AREA FOR LATER USE

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MUSIC

```

1630 C0F3 6921      ADC #21
1640 C0F5 A6FB      LDX $FB
1650 C0F7 9D55C2    STA INPUTTED,X
1660 C0FA E8        INX
1670 C0FB 86FB      STX $FB
1680 C0FD A502      LDA $02
1690 C0FF 2910      AND #10
1700 C101 F00C      BEQ NOT3
1710 C103 18        CLC
1720 C104 98        TYA
1730 C105 6901      ADC #01
1740 C107 A6FB      LDX $FB
1750 C109 9D55C2    STA INPUTTED,X
1760 C10C E8        INX
1770 C10D 86FB      STX $FB
1780 C10F A502      LDA $02
1790 C111 2900      AND #80
1800 C113 F00C      BEQ NOT4
1810 C115 18        CLC
1820 C116 98        TYA
1830 C117 6931      ADC #31
1840 C119 A6FB      LDX $FB
1850 C11B 9D55C2    STA INPUTTED,X
1860 C11E E8        INX
1870 C11F 86FB      STX $FB
1880 C121 C8        INY
1890 C122 98        TYA
1900 C123 290F      AND #0F
1910 C125 F004      BEQ COMPLETE
1920 C127 A8        TAY
1930 C128 4CD3C0    JMP INPUT
1940 C12B           !
1950 C12B           ! INPUT COMPLETED. NOW PAD
1960 C12B           ! OUT TO 3 NOTES
1970 C12B           !
1980 C12B A6FB      COMPLETE LDX $FB
1990 C12D E003      PAD      CPX #03
2000 C12F B008      BCS ENOUGH
2010 C131 A900      LDA #00
2020 C133 9D55C2    STA INPUTTED,X
2030 C136 E8        INX
2040 C137 D0F4      BNE PAD
2050 C139           !
2060 C139           ! NOW CHECK FOR A KEY THAT
2070 C139           ! WAS BEING PLAYED LAST CHECK
2080 C139           !
2090 C139 86FB      ENOUGH  STX $FB
2100 C13B A000      LDY #00
2110 C13D B955C2    CHECK1  LDA INPUTTED,Y
2120 C140 F005      BEQ NEXT1
2130 C142 CD4FC2    CMP VOICE1
2140 C145 F00D      BEQ CONT1
2150 C147 C8        NEXT1  INY
2160 C148 C4FB      CPY $FB
2170 C14A D0F1      BNE CHECK1
2180 C14C A900      LDA #00
2190 C14E 8D52C2    STA VIFLAG
2200 C151 4C5EC1    JMP CHECKV2
2210 C154 A901      CONT1  LDA #01
2220 C156 8D52C2    STA VIFLAG
2230 C159 A900      LDA #00
2240 C15B 9955C2    STA INPUTTED,Y
2250 C15E A000      CHECKV2 LDY #00
! TEST CHIP 1
! NOTHING
! STORE IN TEMPORARY
! AREA FOR LATER USE
! TEST CHIP 4
! NOTHING
! STORE IN TEMPORARY
! AREA FOR LATER USE
! COMPLETE READING
! LOOP
! CHECK FOR 3 KEYS
! YES
! SET TO ZERO
! AND AGAIN
! CHECK V1
! NOT THAT ONE
! YES
! NEXT INPUTTED KEY
! NO COMPARISON
! COMPARISON FOUND
! BLANK KEY

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MUSIC

2260 C160 B955C2	CHECK2	LDA INPUTTED,Y	! CHECK V2
2270 C163 F005		BEQ NEXT2	! NOT THAT ONE
2280 C165 CD50C2		CMP VOICE2	
2290 C168 F00D		BEQ CONT2	! YES
2300 C16A C8	NEXT2	INY	! NEXT INPUTTED KEY
2310 C16B C4FB		CPY \$FB	
2320 C16D D0F1		BNE CHECK2	
2330 C16F A900		LDA #\$00	! NO COMPARISON
2340 C171 8D53C2		STA V2FLAG	
2350 C174 4C81C1		JMP CHECKV3	
2360 C177 A901	CONT2	LDA #\$01	! COMPARISON FOUND
2370 C179 8D53C2		STA V2FLAG	
2380 C17C A900		LDA #\$00	
2390 C17E 9955C2		STA INPUTTED,Y	! BLANK KEY
2400 C181 A000	CHECKV3	LDY #\$00	
2410 C183 B955C2	CHECK3	LDA INPUTTED,Y	! CHECK V3
2420 C186 F005		BEQ NEXT3	! NOT THAT ONE
2430 C188 CD51C2		CMP VOICE3	
2440 C18B F00D		BEQ CONT3	! YES
2450 C18D C8	NEXT3	INY	! NEXT INPUTTED KEY
2460 C18E C4FB		CPY \$FB	
2470 C190 D0F1		BNE CHECK3	
2480 C192 A900		LDA #\$00	! NO COMPARISON
2490 C194 8D54C2		STA V3FLAG	
2500 C197 4C84C1		JMP ALLDONE	
2510 C19A A901	CONT3	LDA #\$01	! COMPARISON FOUND
2520 C19C 8D54C2		STA V3FLAG	
2530 C19F A900		LDA #\$00	
2540 C1A1 9955C2		STA INPUTTED,Y	! BLANK KEY
2550 C1A4	!		
2560 C1A4	! PLAY NOTES		
2570 C1A4	!		
2580 C1A4 AD52C2	ALLDONE	LDA V1FLAG	! PLAY V1
2590 C1A7 D02B		BNE D02	! LEAVE TO PLAY
2600 C1A9 2037C2		JSR GETVOICE	! GET A NEW NOTE
2610 C1AC CD4FC2		CMP VOICE1	
2620 C1AF F023		BEQ D02	! ZERO NOTE, IGNORE
2630 C1B1 8D4FC2		STA VOICE1	
2640 C1B4 0A		ASL A	
2650 C1B5 A8		TAY	
2660 C1B6 AD4EC2		LDA WAVE	! GATE OFF
2670 C1B9 8D04D4		STA \$D404	
2680 C1BC AD4FC2		LDA VOICE1	
2690 C1BF F013		BEQ D02	! ZERO NOTE LEAVE GATE
2700 C1C1 B900C0		LDA \$C000,Y	
2710 C1C4 8D00D4		STA \$D400	! NEW NOTE VALUES
2720 C1C7 B901C0		LDA \$C001,Y	
2730 C1CA 8D01D4		STA \$D401	
2740 C1CD AE4EC2		LDX WAVE	! GATE ON
2750 C1D0 E8		INX	
2760 C1D1 8E04D4		STX \$D404	
2770 C1D4 AD53C2	D02	LDA V2FLAG	! PLAY V2
2780 C1D7 D02B		BNE D03	! LEAVE TO PLAY
2790 C1D9 2037C2		JSR GETVOICE	! GET A NEW NOTE
2800 C1DC CD50C2		CMP VOICE2	
2810 C1DF F023		BEQ D03	! ZERO NOTE, IGNORE
2820 C1E1 8D50C2		STA VOICE2	
2830 C1E4 0A		ASL A	

MUSIC

```

2840 C1E5 A8          TAY
2850 C1E6 AD4EC2      LDA WAVE          ! GATE OFF
2860 C1E9 8D08D4      STA $D40B
2870 C1EC AD50C2      LDA VOICE2
2880 C1EF F013        BEQ D03          ! ZERO NOTE LEAVE GATE
OFF
2890 C1F1 B900C0      LDA $C000,Y
2900 C1F4 8D07D4      STA $D407          ! NEW NOTE VALUES
2910 C1F7 B901C0      LDA $C001,Y
2920 C1FA 8D08D4      STA $D408
2930 C1FD AE4EC2      LDX WAVE          ! GATE ON
2940 C200 E8          INX
2950 C201 8E08D4      STX $D40B
2960 C204 AD54C2 D03  LDA V3FLAG          ! PLAY V3
2970 C207 D02B        BNE DONEALL        ! LEAVE TO PLAY
2980 C209 2037C2      JSR GETVOICE        ! GET A NEW NOTE
2990 C20C CD51C2      CMP VOICE3
3000 C20F F023        BEQ DONEALL        ! ZERO NOTE, IGNORE
3010 C211 8D51C2      STA VOICE3
3020 C214 0A          ASL A
3030 C215 A8          TAY
3040 C216 AD4EC2      LDA WAVE          ! GATE OFF
3050 C219 8D12D4      STA $D412
3060 C21C AD51C2      LDA VOICE3
3070 C21F F013        BEQ DONEALL        ! ZERO NOTE LEAVE GATE
OFF
3080 C221 B900C0      LDA $C000,Y
3090 C224 8D0ED4      STA $D40E          ! NEW NOTE VALUES
3100 C227 B901C0      LDA $C001,Y
3110 C22A 8D0FD4      STA $D40F
3120 C22D AE4EC2      LDX WAVE          ! GATE ON
3130 C230 E8          INX
3140 C231 8E12D4      STX $D412
3150 C234 4C31EA DONEALL JMP $EA31          ! TESTER COMPLETE
3160 C237             !
3170 C237             ! ROUTINE TO PICK OFF NEW VALUE
3180 C237             !
3190 C237 A000        GETVOICE LDY #$00          ! LOOP START
3200 C239 B955C2 GET1  LDA INPUTTED,Y        ! GET VALUE
3210 C23C F008        BEQ GETNEXT        ! ZERO, IGNORE
3220 C23E 48          PHA
3230 C23F A900        LDA #$00          ! BLANK KEY
3240 C241 9955C2      STA INPUTTED,Y
3250 C244 68          PLA
3260 C245 60          RTS          ! RETURN WITH VALUE IN
A
3270 C246 C8          GETNEXT INY          ! NEXT VALUE
3280 C247 C4FB        CPY $FB
3290 C249 D0EE        BNE GET1          ! CONTINUE
3300 C24B A900        LDA #$00          ! NO MORE VALUES
3310 C24D 60          RTS
3320 C24E 10          WAVE   BYT $10          ! WAVE FORM
3330 C24F 00          VOICE1 BYT 0          ! V1 VALUE
3340 C250 00          VOICE2 BYT 0          ! V2
3350 C251 00          VOICE3 BYT 0          ! V3
3360 C252 00          V1FLAG BYT 0          ! V1 PLAY FLAG
3370 C253 00          V2FLAG BYT 0          ! V2
3380 C254 00          V3FLAG BYT 0          ! V3
3390 C255 00          INPUTTED BYT 0          ! START OF INPUT TABLE

```


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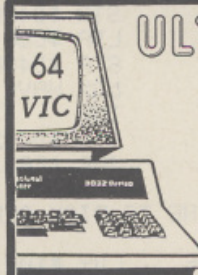
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Machine	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	Average
CBM with PETX2	0.87	5.1	9.4	10.3	11.2	16.5	26.0	6.0	17.5
IBM PC	1.5	5.2	12.1	12.6	13.6	23.5	37.4	3.5	17.6
Osborne 01	1.4	4.4	11.7	11.6	12.4	21.9	34.9	6.1	19.9
Apple 111	1.7	7.2	13.5	14.5	16.0	27.0	42.5	7.5	24.7
ACT Sirius 1	2.0	7.4	17.0	17.5	19.8	35.4	55.9	4.3	24.8
Apple 2	1.3	8.5	16.0	17.8	19.1	28.6	44.8	10.7	30.4
Commodore CBM 8032	1.7	10.0	18.4	20.3	21.9	32.4	51.0	11.9	34.3

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Keeping up-to-date

Do you forget important dates? Help has arrived in the form of a desk diary and calendar program written by G P Raven, which we are publishing in two parts

This program was written for the user who wants to put behind him the bad old days when he constantly forgot his wife's birthday and his wedding anniversary and when family birthdays and other important annual events regularly slipped his mind - I'm talking about me. It is a program which can be referenced daily to see what's on and to enter in appointments and other matters which must be remembered.

Each year the diary will carry forward all permanent entries such as birthdays, anniversaries, days when returns must be made etc but temporary entries referring to appointments etc which have already become obsolete can be deleted by using the REVISE facility.

Because of the limitations which 32k imposes on the number and size of sequential files that can be held in memory, the diary permits only 100 entries. This is, however, likely to be enough for most users since when the diary is full a prompt will ask you to REVISE and entries which are no longer required can be erased to make room for more. You can revise the diary at any time either for the whole year or for a period between two dates that may be entered in response to the prompts.

There is a facility to print (screen or hard copy) a calendar for any month of any year from 1900 to 2999. The current year is stored on disk and held in memory for reference by the diary. If the calendar for any other year is required then after reference to it is finished the program will automatically reload the calendar for the year of the diary.

The printer I use is a Commodore 4022. No allowance has been made in the program for any other type of printer. However, the experienced programmer will find no particular difficulty in altering the program (lines 157 to 175) to suit his own particular printer.

Since graphics are a problem on the 8000 series machines I have written a simple machine code routine to give the

screen headings a touch of class - particularly for the individual pages of the diary. There is also another machine code routine for sorting. The routine I used was direct from Nick Hampshires Library of PET Subroutines which I suitably amended for basic 4.0. Those who don't want to use a machine code sort can insert their own favourite basic routine at line 316 and replace sys32314 where it occurs at lines 78,229,245 and 317 with "gosub 316". The array to sort is zs\$(n-1).

The purpose of the sort is to keep all the entries in chronological order. The first three characters of the string that holds the diary entry are the day and month reduced to internal format at lines 295-299. The next four are the time according to the 24-hour clock. The sort therefore ensures that the entries appear in the array zs\$(n) in date and time order.

The machine code routines must be entered via the MLM and saved on the same disk as the main program. The graphics routine is hidden away in page 1 at \$0110 to \$0131 which is against all the rules but it doesn't seem to interfere with anything there. The sort routine is at top of RAM which is moved to accommodate it at line 8 of the program.

When the desk diary is used for the first time on RUN the screen will inform you that there are NO ENTRIES in the diary and ask for an input of the year for which you want to open the diary. The program then calculates the calendar for that year and saves it on disk as a sequential file called "Diary". This process takes about 35 seconds. Subsequently whenever the diary is referenced the file "Diary" is read into memory straight away and there will be no more long waits unless you wish to see or print a calendar other than the one for which the diary is open.

There is as usual a menu of options:

1. Make an entry
2. Look at an entry
3. Search

4. Print Calendar
5. Revise Entries
6. Start New Diary

To make an entry you simply select 1. and follow the prompts at the bottom of the screen. The date input and validation routine requires the DD/MM/YY format (although it will accept D/M/YY) and the time must be the 24-hour clock. If the entry doesn't have a time such as a birthday just press return. The EVENT should be consistent each time you enter a similar event otherwise when searching you will not find them all. For example if you write "Birthday" sometimes and "birthday" on other occasions, when searching for "Birthdays" the program will not find any that were entered as "birthday". The details of the event should be kept to 30 characters or you will be reminded of that fact. The last prompt is whether or not the entry is permanent or temporary. Permanent entries obviously are those which remain the same each year and temporary ones are appointments/engagements etc which can be deleted at a later stage.

To look at an entry select 2. and the prompt will ask you for the date you wish to look at. Again the date input requires DD/MM/YY. That page of the diary will then be displayed showing all the entries in chronological order. The return to menu option is accomplished by pressing the escape key (chr\$(27)). If you haven't got one, or prefer it, line 89 can be changed to read "if a\$<>"e" then 95. Similarly elsewhere in the program.

Option 3, allows you to search for all the items recorded in the diary for a similar EVENT such as all the Birthdays or Dinner Engagements etc. Simply enter the Event and all entries which were originally entered for the same event will be displayed in date order on the screen. If there is more than a pageful the program will stop until the option to "continue" is taken. If there is

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not then the option to "continue" will return you to the menu as will "escape". The search is made on the EVENT field of the records z\$(0) to z\$(n-1) and on the length of the input search string so that "Birth" will find "Birthday" or "Birthdays" and "App" will find "Appointment" etc.

Option 4, allows you to look at, or print, a calendar for any month or for the entire year. If the entire year option is chosen the calendar will be printed month by month waiting after each printout. There is an option to "escape" at any stage if you wish.

REVISE, option 5, allows you to revise the diary at any stage either for the entire

year such as on 31st Dec. or when the diary is full when you may wish to revise only the first few Months. The REVERSE option deletes all temporary entries between the dates input and makes room for more. Following REVERSE the program rewrites the "Entries" files to disk drive #0. At the end of a year the REVERSE option can be used to start the diary for the following year. It will automatically calculate the calendar for the next consecutive year and write it to disk. At the same time the diary entries will be revised and rewritten to disk having erased ALL the temporary entries but preserving all the permanent

ones for the new year.

Option 6 may be used if you wish to start a completely new diary and erase ALL the entries permanent or temporary. Don't forget that in a leap year you may have a PERMANENT entry on the 29th February. The REVISE procedure will not erase this and it will reappear whenever the calendar in memory is for a leap year. If the page for 29th Feb is selected the DATE INVALID prompt will appear except when $yr = \text{int}(yr/4)$, i.e. a leap year.

The rest is the hard slog of typing in the program and de-bugging. I think you may find it worth while and at least will save you the cost of a new Desk Diary until the year 2999.

```

1 rem*****
2 rem* desk diary and calendar *
3 rem* program written by g.p.raven - jan 1984 *
4 rem* *
5 rem*****
6 ifathen8
7 a=1:dload"titles"
8 poke52,0:poke53,120:c lr:ifpeek(32314)=72then10
9 dload"sort"
10 print"日":dimm$(12),d(12),wk$(7),da$(366):lp=0:nd=366:nc=0:n=0
   :v$=chr$(21):b$=chr$(7):dy=0:cl=0
11 dimzs$(100),ex$(15),ey$(45):nm$="Diary"
12 forx=1to12:readm$(x),d(x):nextx
13 forj=1to7:readwk$(j):nextj:f6=0
14 z1=32300:pokez1,asc("z"):pokez1+1,asc("s"):poke144,88:tp$=" *日期"
15 bk$="*****"
16 sp$=""
17 d$="*****"
18 dimhh$(42):sh=0:ny=0
19 poke59468,12:open7,4,7:print#7:close7:poke59468,14
20 tt$="Desk Diary"+y$:gosub294:gosub300
21 ifnc=1thengosub272:gosub261:cl=1
22 ifcl=0thengosub253
23 ifnc=1thengosub272:gosub261:cl=1:tt$="Desk Diary"+y$:gosub294
24 print"日"spc(25)"*****1. Make an Entry
25 printspc(25)"2. Look at an Entry
26 printspc(25)"3. Search
27 printspc(25)"4. Print Calendar
28 printspc(25)"5. Revise Entries
29 printspc(25)"6. Start New日 Diary
30 bm$="日Select 1 - 6 日 ('*' to Close Diary)日":gosub359
31 geta$:ifa$=""then31
32 a=val(a$):ifa$="*"then36
33 ifa<1ora>6then31
34 onagosub38,81,91,118,208,249
35 goto20
36 iff6thengosub308
37 print"日":end
38 tt$="Diary "+y$+"- Entries":gosub294
39 ifn=>100thenbm$="日Diary Full - Please Revise日":wt=1:gosub361:goto224

```


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```

40 bm$="For Which Date (DD/MM/YY):"+sp$+bk$+tp$:gosub359:inputdt$
41 ifdt$="*"thenprint"Error":goto40
42 gosub326:ifp6=1thenbm$="Date Invalid":wt=1:gosub361:goto38
43 f$(6)=dt$
44 gosub295:f$(1)=fi$
45 iflp=0theniffi=60thenbm$="Not a Leap Year":wt=1:gosub361
46 gosub340
47 bm$="Continue Escape":gosub361
48 geta$:ifa$=""then48
49 ifa$="c"then52
50 ifa$=chr$(27)then20
51 ifa$<>"c"anda$<>chr$(27)then47
52 bm$="Time"+sp$+bk$+tp$:gosub359:inputf$(2)
53 iff$(2)="*"thenf$(2)="----"
54 iflen(f$(2))<>4thenbm$="24 Hour Clock":wt=1:gosub361:goto52
55 bm$="Event"+sp$+bk$+tp$:gosub359:inputf$(3)
56 iff$(3)="*"then55
57 iflen(f$(3))>15thenbm$="15 chars only":wt=1:gosub361:goto55
58 f$(3)=left$(f$(3)+",15)
59 bm$="Details"+sp$+bk$+tp$:gosub359:inputf$(4)
60 iff$(4)="*"then59
61 iflen(f$(4))>30thenbm$="30 chars only":wt=1:gosub361:goto55
62 f$(4)=left$(f$(4)+",30)
63 bm$="Permanent Temporary":gosub359
64 geta$:ifa$=""then64
65 ifa$="t"thenf$(5)="t"
66 ifa$="p"thenf$(5)="p"
67 ifa$<>"t"anda$<>"p"then63
68 bm$="All Correct y/n":gosub359:inputyn$
69 ifleft$(yn$,1)<>"y"then38
70 forj=1to6:zs$(j)=zs$(j)+f$(j):next
71 en=en+1:ex$(en)=zs$(n):n=n+1:print"Error"
72 forq=1toen
73 printmid$(ex$(q),4,4)spc(5)mid$(ex$(q),8,15)spc(10)mid$(ex$(q),23,30)
74 nextq
75 bm$="More Escape":gosub359
76 geta$:ifa$=""then76
77 ifa$="m"then52
78 ifa$=chr$(27)thensys32314:f6=1:return
79 ifa$<>"m"anda$<>chr$(27)then76
80 goto52
81 tt$="Diary "+y$+"- Entries":gosub294
82 bm$="For Which Date (DD/MM/YY):"+sp$+bk$+tp$:gosub359:inputdt$
83 ifdt$="*"thenprint"Error":goto40
84 gosub326:ifp6=1thenbm$="Date Invalid":wt=1:gosub361:goto82
85 f$(6)=dt$
86 gosub295:f$(1)=fi$
87 gosub340
88 bm$="Escape":gosub359
89 geta$:ifa$<>chr$(27)then89
90 return
91 nn=0:q=1:qq=15:ifsh=1thenforj=1ton-1:ey$(j)="" :next
92 tt$="Diary "+y$+" - Search":gosub294
93 bm$="Event":gosub359:inputev$
94 bm$="Searching Diary - wait!":gosub359

```


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```

95 forj=1to45:ey$(j)="" :next
96 forj=0ton-1
97 ifleft$(mid$(zs$(j),8,15),len(ev$))<>ev$then100
98 nn=nn+1:ey$(nn)=zs$(j)
99 ifnn=45thenj=n-1
100 nextj
101 ifnn=0thenbm$="No "+ev$+" 's Recorded in Diary":wt=1:gosub361:return
102 print" "
103 print"Date"      "Event"      "Details"
104 q5=0:forj=qtoqq
105 ifey$(j)=""theney$(j)=sp$:goto109
106 iflp<>1thenifval(left$(ey$(j),3))=60theney$(j)=sp$:goto109
107 printmid$(ey$(j),54,6);right$(y$,2);spc(5)mid$(ey$(j),8,15)spc(87);
108 printmid$(ey$(j),23,30)
109 nextj
110 ifnn>qqthenq=q+1:qq=qq+15:q5=1
111 ifqq>45thenqq=45
112 bm$="Continue"esc$ape":gosub359
113 geta$:ifa$=""then113
114 ifa$="c"thenifq5=1then102
115 ifa$="c"thenifq5=0thensh=1:return
116 ifa$=chr$(27)thensh=1:return
117 ifa$<>"c"anda$<>chr$(27)then112
118 tt$="Print Calendar":gosub294:y3$=""
119 bm$="For Which Year"+sp$+bk$+tp$:gosub359:inputy3$
120 ify3$="*"then119
121 iflen(y3$)<>4then119
122 ify$=y3$then125
123 ny=1:bm$="Calculating Calendar for "+y3$+" - Wait!":gosub359
124 y8$=y$:y$=y3$:gosub277
125 bm$="Entire year"month only"esc$ape":gosub359
126 geta$:ifa$=""then126
127 ifa$=chr$(27)then206
128 ifa$="e"then145
129 ifa$="m"then131
130 ifa$<>"e"anda$<>"m"anda$<>chr$(27)then126
131 bm$="Which Month"+sp$+bk$+tp$:gosub359:inputmt$
132 ifmt$="*"then131
133 forj=1to12
134 ifmt$=left$(m$(j),len(mt$))thenmt=d(j):mx=j:goto137
135 nextj
136 goto131
137 gosub197
138 gosub176
139 bm$="Hard copy"esc$ape":gosub359
140 geta$:ifa$=""then140
141 ifa$=chr$(27)then144
142 ifa$="h"thengosub157:goto144
143 ifa$<>"h"anda$<>chr$(27)then139
144 gosub206:return
145 sb=ss
146 forjk=1to12:mx=jk
147 gosub197:gosub176
148 bm$="Hard copy"Continue"esc$ape":gosub359
149 geta$:ifa$=""then149

```


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```

150 ifa$="c"then155
151 ifa$=chr$(27)then156
152 ifa$="h"then154
153 ifa$<>"h"anda$<>"c"anda$<>chr$(27)then149
154 gosub157
155 nextjk
156 gosub206:return
157 fg=0:open3,4,6:print#3,chr$(20)
158 open4,4:cmd4
159 forj=1to42:hh$(j)="**":next
160 printlz$mx$;y$:print
161 printlz$l1$:printlz$l4$:printlz$l2$:printlz$l4$:printlz$l5$
162 printlz$l4$
163 fg=d(mx)+sb-1
164 forj=1tosb-1:hh$(j)="**":nextj
165 forj=1tod(mx):hh$(j+sb-1)=mid$(str$(j)+"",2,2):next
166 ct=0:printspc(10)
167 forj=1to42
168 bn$=chr$(165)+" "+hh$(j)+" ":by$=chr$(165)
169 ifct=7thenct=0:printby$" ":printlz$l3$:printlz$l4$:printlz$;
170 printbn$;
171 ct=ct+1
172 nextj
173 printby$:printlz$l4$:printlz$l5$
174 print#4:close4:close3
175 return
176 print"#####" left$(m$(mx)+"",10)y$
177 ifmx=1thensb=ss:goto186
178 sx%=0:sb=0
179 forj=0tomx-1:sx%=sx%+d(j):next
180 sx%=sx%-(7-ss)
181 forj=1to52
182 sx%=sx%-7
183 ifsx%=0thensb=7:j=53
184 ifsx%>0andsx%<7thensb=sx%:j=53
185 nextj
186 fg=0:print"##### "spc(10);
187 fg=d(mx)+sb-1
188 forj=1tosb-1:hh$(j)="**":nextj
189 forj=1tod(mx):hh$(j+sb-1)=mid$(str$(j)+"",2,2):next
190 ct=0
191 forj=1tofg
192 ifct=7thenct=0:print" ":printspc(10);
193 printspc(3)hh$(j)spc(3);
194 ct=ct+1
195 nextj
196 return
197 l1$="":l2$="":l3$="":l4$="":l5$=""
198 print" ":ly$="##### ":lz$="##### "
199 forj=1to56:l1$=l1$+chr$(183):l5$=l5$+chr$(183):next
200 l2$="| Mon | Tues | Wed | Thur | Fri | Sat | Sun |
201 forj=1to56:l3$=l3$+chr$(192):next
202 forj=1to7:l4$=l4$+chr$(165)+" ":next:l4$=l4$+chr$(165)
203 printly$l1$:printlz$l2$:printlz$l1$
204 forj=1to6:printlz$l4$:printlz$l3$:next

```


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```

205 return
206 if val(y3$) <> yr then gosub 254
207 return
208 nx=0
209 tt$="Diary "+y$+" - Revise Entries":gosub 294
210 bm$="Enter entire diary  Enter part of diary  Escape":gosub 359
211 geta$:ifa$="" then 211
212 ifa$=chr$(27) then 20
213 ifa$="e" then 232
214 ifa$="p" then 216
215 ifa$ <> "p" and a$ <> "e" and a$ <> chr$(27) then 210
216 bm$="From (DD/MM/YY) " + sp$ + bk$ + tp$:gosub 359:input dt$
217 if dt$="*" then 216
218 gosub 326:if p6=1 then bm$="Date Invalid":wt=1:gosub 361:goto 216
219 d1$=dt$:gosub 295:f1=f1
220 bm$="To (DD/MM/YY) " + sp$ + bk$ + tp$:gosub 359:input dt$
221 if dt$="*" then 221
222 gosub 326:if p6=1 then bm$="Date Invalid":wt=1:gosub 361:goto 220
223 d2$=dt$:gosub 295:f2=f1
224 bm$="Revising Diary for "+y$+" from "+d1$+" to "+d2$+":gosub 359
225 for j=0 to n-1
226 if val(left$(zs$(j),3)) < floor val(left$(zs$(j),3)) > f2 then 228
227 if mid$(zs$(j),53,1)="t" then zs$(j)="" :n=n-1
228 next j
229 sys 32314
230 rv$="Revised ":gosub 310:dy=1
231 bm$="Revision Complete":wt=1:gosub 361:return
232 bm$="Enter current year  Enter new year  Escape":gosub 359
233 geta$:ifa$="" then 233
234 ifa$=chr$(27) then 20
235 ifa$="c" then 242
236 ifa$="n" then nx=1:gosub 384:goto 238
237 ifa$ <> "n" and a$ <> "c" and a$ <> chr$(27) then 232
238 if left$(yn$,1) <> "y" then nx=0:return
239 y1$=str$(val(y$)+1)
240 bm$="Calculating Calendar for "+y1$+" - Wait!":gosub 359
241 y$=y1$:gosub 279
242 for j=0 to n-1
243 if mid$(zs$(j),53,1)="t" then zs$(j)="" :n=n-1
244 next j
245 sys 32314
246 if nx=1 then gosub 261
247 rv$="Revised ":gosub 310:dy=1
248 bm$="Revision Complete":wt=1:gosub 361:return
249 gosub 384
250 if left$(yn$,1) <> "y" then return
251 gosub 272:gosub 261:cl=1:scratch "Entries"
252 for j=0 to n-1:zs$(j)="" :next: return
253 if cl=1 then return
254 dopen#8,(nm$):gosub 355
255 if ds=62 then nnc=1:dc lose#8:return
256 input#8,ss,nd,lp,y$
257 bm$="Loading Calendar for "+y$+":gosub 359
258 for j=1 to nd:input#8,da$(j):next
259 y=val(y$):if y/4=int(y/4) then nd(2)=29

```


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```

260 gosub355:dc lose#8:cl=1:yr=val(y$):return
261 bm$="Writing Calendar for "+y$+" to Disk Drive #0":gosub359
262 dopen#8,(nm$),w:gosub355
263 ifds=63thendc lose#8:scratch(nm$):goto262
264 print#8,ss
265 print#8,nd
266 print#8,lp
267 print#8,y$
268 forj=1tond
269 print#8,da$(j)
270 nextj
271 gosub355:dc lose#8:cl=0:nc=0:return
272 tt$="Write New Calendar":gosub294:print"
273 bm$="Enter Year of Diary"+sp$+bk$+tp$:gosub359:inputy$
274 ify$="*"then20
275 iflen(y$)<>4then273
276 bm$="Calculating Calendar for "+y$+" - Wait!":gosub359
277 ify$="*"then print"":goto275
278 iflen(y$)<>4thenprint"":goto275
279 ifval(y$)>1999theny1=2000
280 y1=1900:lp=0
281 y=val(y$):d=int((y-y1)/4)+(y-y1):s=d-int((d/7))*7
282 ify/4=int(y/4)thend(2)=29:lp=1
283 da=1:ifs=0thens=7:ss=s:goto285
284 s=s+1:ss=s
285 db=1:nm=1:forj=1tond
286 ifdb>d(nm)thennm=nm+1:db=1
287 da$(j)=mid$(str$(s),2,1)+mid$(str$(db)+",2,2)
288 da$(j)=da$(j)+mid$(str$(nm)+",2,2)
289 ifs=7thens=1:goto291
290 s=s+1
291 db=db+1
292 nextj
293 return
294 print":sys272:printspc((80-len(tt$))/2)tt$:return
295 fi=0:i+lp=1thend(2)=29
296 forj=1topm:fi=fi+d(j-1):next
297 fi=fi+pd
298 fi$=right$("000"+right$(str$(fi),len(str$(fi))-1),3)
299 return
300 bm$="Reading Diary Entries":gosub32000
301 ifdy=1thenreturn
302 dopen#11,"Entries":gosub355
303 ifds=62thenbm$="No Entries in Diary":wt=1:gosub361
304 ifds=62thendc lose#11:dy=1:return
305 input#11,n
306 forj=0ton-1:input#11,zs$(j):next
307 gosub355:dc lose#11:dy=1:return
308 rv$=""
309 gosub316
310 scratch"Entries"
311 bm$="Writing "+rv$+"Diary Entries":gosub359
312 dopen#11,"Entries",w:gosub355
313 print#11,n
314 forj=0ton-1:print#11,zs$(j):next

```


Scrolling routine

This month we take a look at smooth scrolling on the 64.

There is no problem in scrolling to the eight locations available in the VIC chip register 22 – the problem comes when all of the characters have to be moved over and the register reset. This could not be done in Basic because it is too slow.

Therefore, the routine that follows is done in interrupts, raster interrupts to be precise. This produces a very smooth, flicker-free scroll.

In some games, in particular Killer Watt by Alligata, this smooth scrolling is done to fantastic effect with the smooth scrolling going in both directions and also with three different speeds in both directions, also a zero speed.

The speeds are controlled by the joystick in port 2 and are used in respect

to a sprite moving against the flow of the scroll.

Another aspect to note about the routine is that the colour memory is not scrolled. This is due to the speed of the scrolling.

Sixteen lines are scrolled in all leaving the top five lines and the bottom four lines for stationary text, although it would be wise to leave the lines directly above and below the scrolling area blank.

The main difference between Killer Watts scrolling and this routine is that, in this routine, the display is scrolled onto the other side of the screen whereas in Killer Watt the display is brought in from an area of screen data.

The scrolling is initialised by SYS49152 and after that it will run independently of any other program.

```

10 I=49152:T=0
20 READA:IFA=-1THEN50
30 POKEI,A:I=I+1
40 T=T+A:GOTO20
50 IFT<107175THENPRINT"CHECKSUM ERROR":END
60 IFI<50068THENPRINT"DATA ERROR: NO. OF VALUES":END
70 PRINT"DATA OK. START SCROLL WITH SYS49152"
80 END
100 DATA120,169,39,141,20,3,169
110 DATA192,141,21,3,173,17,208
120 DATA41,127,141,17,208,169,217
130 DATA141,18,208,173,26,208,9
140 DATA1,141,26,208,169,200,141
150 DATA22,208,88,96,169,1,44
160 DATA25,208,208,3,76,49,234
170 DATA173,145,195,240,65,173,142
180 DATA195,208,91,173,141,195,41
190 DATA7,205,143,195,240,13,173
200 DATA141,195,56,237,145,195,141
210 DATA141,195,76,119,192,173,144
220 DATA195,141,143,195,173,146,195
230 DATA141,145,195,169,1,141,147
240 DATA195,169,200,141,22,208,169
250 DATA199,141,141,195,160,1,32
260 DATA11,193,200,192,40,208,248
270 DATA169,1,141,25,208,169,200
280 DATA141,22,208,169,211,141,20
290 DATA3,169,192,141,21,3,169

```


MACHINE CODE

```

300 DATA90,141,18,208,104,168,104
310 DATA170,104,64,173,141,195,41
320 DATA7,205,143,195,240,13,173
330 DATA141,195,24,109,145,195,141
340 DATA141,195,76,119,192,173,144
350 DATA195,141,143,195,173,146,195
360 DATA141,145,195,169,1,141,147
370 DATA195,169,200,141,22,208,169
380 DATA192,141,141,195,160,38,32
390 DATA108,193,136,16,250,76,119
400 DATA192,169,1,44,25,208,208
410 DATA3,76,49,234,173,141,195
420 DATA141,22,208,169,217,141,18
430 DATA208,169,39,141,20,3,169
440 DATA192,141,21,3,169,1,141
450 DATA25,208,173,142,195,208,6
460 DATA32,205,193,76,5,193,32
470 DATA48,194,104,168,104,170,104
480 DATA64,185,200,4,153,199,4
490 DATA185,240,4,153,239,4,185
500 DATA24,5,153,23,5,185,64
510 DATA5,153,63,5,185,104,5
520 DATA153,103,5,185,144,5,153
530 DATA143,5,185,184,5,153,183
540 DATA5,185,224,5,153,223,5
550 DATA185,8,6,153,7,6,185
560 DATA48,6,153,47,6,185,88
570 DATA6,153,87,6,185,128,6
580 DATA153,127,6,185,168,6,153
590 DATA167,6,185,208,6,153,207
600 DATA6,185,248,6,153,247,6
610 DATA185,32,7,153,31,7,96
620 DATA185,200,4,153,201,4,185
630 DATA240,4,153,241,4,185,24
640 DATA5,153,25,5,185,64,5
650 DATA153,65,5,185,104,5,153
660 DATA105,5,185,144,5,153,145
670 DATA5,185,184,5,153,185,5
680 DATA185,224,5,153,225,5,185
690 DATA8,6,153,9,6,185,48
700 DATA6,153,49,6,185,88,6
710 DATA153,89,6,185,128,6,153
720 DATA129,6,185,168,6,153,169
730 DATA6,185,208,6,153,209,6
740 DATA185,248,6,153,249,6,185
750 DATA32,7,153,33,7,96,173
760 DATA200,4,141,239,4,173,240
770 DATA4,141,23,5,173,24,5
780 DATA141,63,5,173,64,5,141
790 DATA103,5,173,104,5,141,143
800 DATA5,173,144,5,141,183,5
810 DATA173,184,5,141,223,5,173
820 DATA224,5,141,7,6,173,8
830 DATA6,141,47,6,173,48,6
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850 DATA127,6,173,128,6,141,167

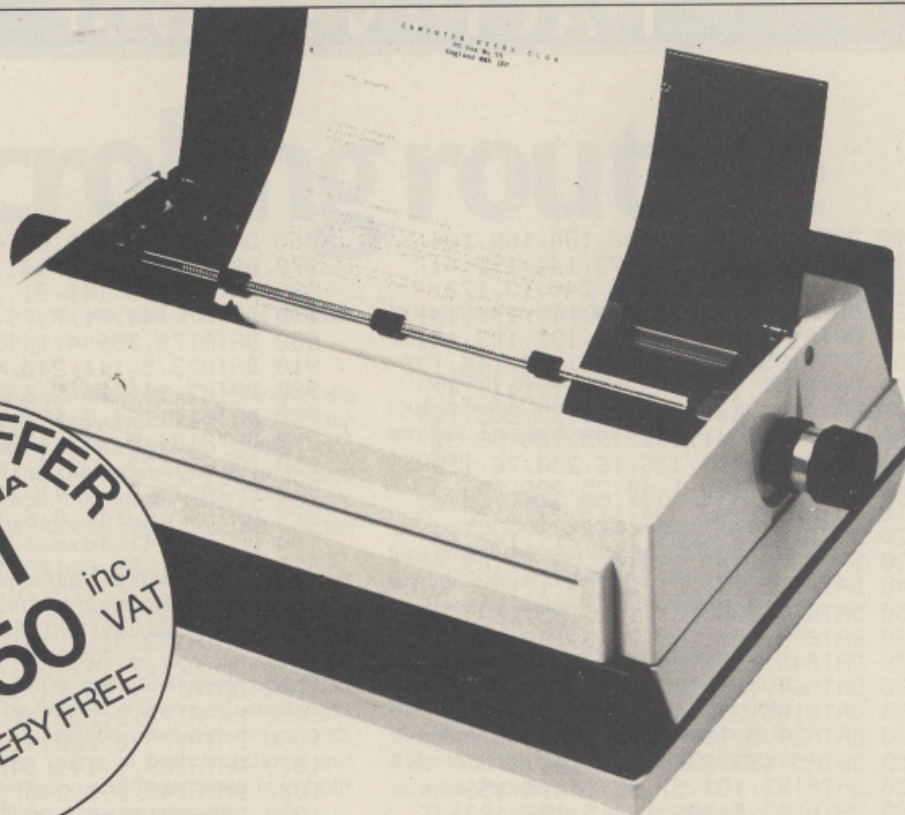
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870 DATA173,208,6,141,247,6,173
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900 DATA173,239,4,141,200,4,173
910 DATA23,5,141,240,4,173,63
920 DATA5,141,24,5,173,103,5
930 DATA141,64,5,173,143,5,141
940 DATA104,5,173,183,5,141,144
950 DATA5,173,223,5,141,184,5
960 DATA173,7,6,141,224,5,173
970 DATA47,6,141,8,6,173,87
980 DATA6,141,48,6,173,127,6
990 DATA141,88,6,173,167,6,141
1000 DATA128,6,173,207,6,141,168
1010 DATA6,173,247,6,141,208,6
1020 DATA173,31,7,141,248,6,173
1030 DATA71,7,141,32,7,76,7
1040 DATA195,173,147,195,208,1,96
1050 DATA173,0,220,41,4,240,13
1060 DATA173,0,220,41,8,240,48
1070 DATA169,1,141,147,195,96,173
1080 DATA145,195,240,24,74,208,6
1090 DATA141,145,195,76,167,194,141
1100 DATA146,195,141,144,195,206,144
1110 DATA195,169,0,141,147,195,96
1120 DATA169,1,141,142,195,169,7
1130 DATA141,143,195,76,167,194,173
1140 DATA145,195,201,4,240,201,201
1150 DATA0,240,12,10,141,146,195
1160 DATA141,144,195,206,144,195,201
1170 DATA0,208,17,169,1,141,145
1180 DATA195,141,146,195,169,0,141
1190 DATA143,195,141,144,195,96,169
1200 DATA0,141,147,195,96,173,147
1210 DATA195,208,1,96,173,0,220
1220 DATA41,8,240,10,173,0,220
1230 DATA41,4,240,62,76,167,194
1240 DATA173,145,195,240,41,74,208
1250 DATA9,141,145,195,169,1,141
1260 DATA147,195,96,141,146,195,201
1270 DATA2,208,8,169,6,141,144
1280 DATA195,76,70,195,141,146,195
1290 DATA169,7,141,144,195,169,0
1300 DATA141,147,195,96,169,0,141
1310 DATA142,195,169,0,141,143,195
1320 DATA76,167,194,173,145,195,201
1330 DATA4,240,42,201,0,240,22
1340 DATA10,141,146,195,201,4,208
1350 DATA6,141,144,195,76,70,195
1360 DATA169,6,141,144,195,76,70
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1380 DATA146,195,169,7,141,143,195
1390 DATA141,144,195,76,167,194,199
1400 DATA0,0,0,1,1,1,-1
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Print Speed: 120 wpm
 Character set 128 ASCII 88 printable
 Character spacing: 12 CPI
 Printing: Unidirectional
 Paper width: 13" max.
 Writing line: 10.5" 126 character line
 Line spacing: 6 lines per inch
 Paper Feed: Friction, single sheet or fanfold.
 240 volts, 50Hz
 Dimensions: (H) 6.4" (W) 19.5" (D) 12.4"
 Weight: 18.5 lbs

Operator Controls: Power on/off, top of form, impression controls (5 levels)

INTERFACES

Parallel
 Centronics compatible, 7 bit parallel data, 3 control lines (data, strobe, busy, acknowledge)

Serial
 RS232C compatible, 50-19200 BPS, parity and character bit length all switch selectable.

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*Delete as applicable			Total	Expiry date of card _____
				Signature _____
				Name _____
				Address _____
				Postcode _____
				Telephone No. _____
				Make/Model of my computer _____

CCI 5/84

MACHINE CODE

0	C000	78	SEI		60	C091	A8	TAY	
1	C001	A927	LDA	##27	61	C092	68	PLA	
2	C003	8D1403	STA	#0314	62	C093	AA	TAX	
3	C006	A9C0	LDA	##C0	63	C094	68	PLA	
4	C008	8D1503	STA	#0315	64	C095	40	RTI	
5	C00B	AD11D0	LDA	\$D011	65	C096	AD8DC3	LDA	#C38D
6	C00E	297F	AND	##7F	66	C099	2907	AND	##07
7	C010	8D11D0	STA	\$D011	67	C09B	CD8FC3	CMP	#C38F
8	C013	A9D9	LDA	##D9	68	C09E	F00D	BEQ	#C0AD
9	C015	8D12D0	STA	\$D012	69	C0A0	AD8DC3	LDA	#C38D
10	C018	AD1AD0	LDA	\$D01A	70	C0A3	18	CLC	
11	C01B	0901	ORA	##01	71	C0A4	6D91C3	ADC	#C391
12	C01D	8D1AD0	STA	\$D01A	72	C0A7	8D8DC3	STA	#C38D
13	C020	A9C8	LDA	##C8	73	C0AA	4C77C0	JMP	#C077
14	C022	8D16D0	STA	\$D016	74	C0AD	AD90C3	LDA	#C390
15	C025	58	CLI		75	C0B0	8D8FC3	STA	#C38F
16	C026	60	RTS		76	C0B3	AD92C3	LDA	#C392
17	C027	A901	LDA	##01	77	C0B6	8D91C3	STA	#C391
18	C029	2C19D0	BIT	\$D019	78	C0B9	A901	LDA	##01
19	C02C	D003	BNE	#C031	79	C0BB	8D93C3	STA	#C393
20	C02E	4C31EA	JMP	#EA31	80	C0BE	A9C8	LDA	##C8
21	C031	AD91C3	LDA	#C391	81	C0C0	8D16D0	STA	\$D016
22	C034	F041	BEQ	#C077	82	C0C3	A9C0	LDA	##C0
23	C036	AD8EC3	LDA	#C38E	83	C0C5	8D8DC3	STA	#C38D
24	C039	D05B	BNE	#C096	84	C0C8	A026	LDY	##26
25	C03B	AD8DC3	LDA	#C38D	85	C0CA	206CC1	JSR	#C16C
26	C03E	2907	AND	##07	86	C0CD	88	DEV	
27	C040	CD8FC3	CMP	#C38F	87	C0CE	10FA	BPL	#C0CA
28	C043	F00D	BEQ	#C052	88	C0D0	4C77C0	JMP	#C077
29	C045	AD8DC3	LDA	#C38D	89	C0D3	A901	LDA	##01
30	C048	38	SEC		90	C0D5	2C19D0	BIT	\$D019
31	C049	ED91C3	SBC	#C391	91	C0D8	D003	BNE	#C0DD
32	C04C	8D8DC3	STA	#C38D	92	C0DA	4C31EA	JMP	#EA31
33	C04F	4C77C0	JMP	#C077	93	C0DD	AD8DC3	LDA	#C38D
34	C052	AD90C3	LDA	#C390	94	C0E0	8D16D0	STA	\$D016
35	C055	8D8FC3	STA	#C38F	95	C0E3	A9D9	LDA	##D9
36	C058	AD92C3	LDA	#C392	96	C0E5	8D12D0	STA	\$D012
37	C05B	8D91C3	STA	#C391	97	C0E8	A927	LDA	##27
38	C05E	A901	LDA	##01	98	C0EA	8D1403	STA	#0314
39	C060	8D93C3	STA	#C393	99	C0ED	A9C0	LDA	##C0
40	C063	A9C8	LDA	##C8	100	C0EF	8D1503	STA	#0315
41	C065	8D16D0	STA	\$D016	101	C0F2	A901	LDA	##01
42	C068	A9C7	LDA	##C7	102	C0F4	8D19D0	STA	\$D019
43	C06A	8D8DC3	STA	#C38D	103	C0F7	AD8EC3	LDA	#C38E
44	C06D	A001	LDY	##01	104	C0FA	D006	BNE	#C102
45	C06F	200BC1	JSR	#C10B	105	C0FC	20CDC1	JSR	#C1CD
46	C072	C8	INY		106	C0FF	4C05C1	JMP	#C105
47	C073	C028	CPY	##28	107	C102	2030C2	JSR	#C230
48	C075	D0F8	BNE	#C06F	108	C105	68	PLA	
49	C077	A901	LDA	##01	109	C106	A8	TAY	
50	C079	8D19D0	STA	\$D019	110	C107	68	PLA	
51	C07C	A9C8	LDA	##C8	111	C108	AA	TAX	
52	C07E	8D16D0	STA	\$D016	112	C109	68	PLA	
53	C081	A9D3	LDA	##D3	113	C10A	40	RTI	
54	C083	8D1403	STA	#0314	114	C10B	B9C804	LDA	#04C8.Y
55	C086	A9C0	LDA	##C0	115	C10E	99C704	STA	#04C7.Y
56	C088	8D1503	STA	#0315	116	C111	B9F004	LDA	#04F0.Y
57	C08B	A95A	LDA	##5A	117	C114	99EF04	STA	#04EF.Y
58	C08D	8D12D0	STA	\$D012	118	C117	B91805	LDA	#0518.Y
59	C090	68	PLA						

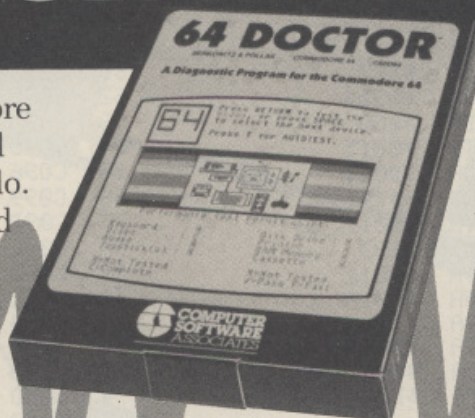
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MACHINE CODE

119	C11A	991705	STA	\$0517,Y	178	C1C9	992107	STA	\$0721,Y
120	C11D	B94005	LDA	\$0540,Y	179	C1CC	60	RTS	
121	C120	993F05	STA	\$053F,Y	180	C1CD	ADC804	LDA	\$04C8
122	C123	B96805	LDA	\$0568,Y	181	C1D0	8DEF04	STA	\$04EF
123	C126	996705	STA	\$0567,Y	182	C1D3	ADF004	LDA	\$04F0
124	C129	B99005	LDA	\$0590,Y	183	C1D6	8D1705	STA	\$0517
125	C12C	998F05	STA	\$058F,Y	184	C1D9	AD1805	LDA	\$0518
126	C12F	B9B805	LDA	\$05B8,Y	185	C1DC	8D3F05	STA	\$053F
127	C132	99B705	STA	\$05B7,Y	186	C1DF	AD4005	LDA	\$0540
128	C135	B9E005	LDA	\$05E0,Y	187	C1E2	8D6705	STA	\$0567
129	C138	99DF05	STA	\$05DF,Y	188	C1E5	AD6805	LDA	\$0568
130	C13B	B90806	LDA	\$0508,Y	189	C1E8	8D8F05	STA	\$058F
131	C13E	990706	STA	\$0607,Y	190	C1EB	AD9005	LDA	\$0590
132	C141	B93006	LDA	\$0630,Y	191	C1EE	8DB705	STA	\$05B7
133	C144	992F06	STA	\$062F,Y	192	C1F1	ADB805	LDA	\$05B8
134	C147	B95806	LDA	\$0658,Y	193	C1F4	8DDF05	STA	\$05DF
135	C14A	995706	STA	\$0657,Y	194	C1F7	ADE005	LDA	\$05E0
136	C14D	B98006	LDA	\$0680,Y	195	C1FA	8D0706	STA	\$0607
137	C150	997F06	STA	\$067F,Y	196	C1FD	AD0806	LDA	\$0608
138	C153	B9A806	LDA	\$06A8,Y	197	C200	8D2F06	STA	\$062F
139	C156	99A706	STA	\$06A7,Y	198	C203	AD3006	LDA	\$0630
140	C159	B9D006	LDA	\$06D0,Y	199	C206	8D5706	STA	\$0657
141	C15C	99CF06	STA	\$06CF,Y	200	C209	AD5806	LDA	\$0658
142	C15F	B9F806	LDA	\$06F8,Y	201	C20C	8D7F06	STA	\$067F
143	C162	99F706	STA	\$06F7,Y	202	C20F	AD8006	LDA	\$0680
144	C165	B92007	LDA	\$0720,Y	203	C212	8DA706	STA	\$06A7
145	C168	991F07	STA	\$071F,Y	204	C215	ADA806	LDA	\$06A8
146	C16B	60	RTS		205	C218	8DCF06	STA	\$06CF
147	C16C	B9C804	LDA	\$04C8,Y	206	C21B	ADD006	LDA	\$06D0
148	C16F	99C904	STA	\$04C9,Y	207	C21E	8DF706	STA	\$06F7
149	C172	B9F004	LDA	\$04F0,Y	208	C221	ADF806	LDA	\$06F8
150	C175	99F104	STA	\$04F1,Y	209	C224	8D1F07	STA	\$071F
151	C178	B91805	LDA	\$0518,Y	210	C227	AD2007	LDA	\$0720
152	C17B	991905	STA	\$0519,Y	211	C22A	8D4707	STA	\$0747
153	C17E	B94005	LDA	\$0540,Y	212	C22D	4C93C2	JMP	\$C293
154	C181	994105	STA	\$0541,Y	213	C230	ADEF04	LDA	\$04EF
155	C184	B96805	LDA	\$0568,Y	214	C233	8DC804	STA	\$04C8
156	C187	996905	STA	\$0569,Y	215	C236	AD1705	LDA	\$0517
157	C18A	B99005	LDA	\$0590,Y	216	C239	8DF004	STA	\$04F0
158	C18D	999105	STA	\$0591,Y	217	C23C	AD3F05	LDA	\$053F
159	C190	B9B805	LDA	\$05B8,Y	218	C23F	8D1805	STA	\$0518
160	C193	99B905	STA	\$05B9,Y	219	C242	AD6705	LDA	\$0567
161	C196	B9E005	LDA	\$05E0,Y	220	C245	8D4005	STA	\$0540
162	C199	99E105	STA	\$05E1,Y	221	C248	AD8F05	LDA	\$058F
163	C19C	B90806	LDA	\$0608,Y	222	C24B	8D6805	STA	\$0568
164	C19F	990906	STA	\$0609,Y	223	C24E	ADB705	LDA	\$05B7
165	C1A2	B93006	LDA	\$0630,Y	224	C251	8D9005	STA	\$0590
166	C1A5	993106	STA	\$0631,Y	225	C254	ADD005	LDA	\$05DF
167	C1A8	B95806	LDA	\$0658,Y	226	C257	8DB805	STA	\$05B8
168	C1AB	995906	STA	\$0659,Y	227	C25A	AD0706	LDA	\$0607
169	C1AE	B98006	LDA	\$0680,Y	228	C25D	8DE005	STA	\$05E0
170	C1B1	998106	STA	\$0681,Y	229	C260	AD2F06	LDA	\$062F
171	C1B4	B9A806	LDA	\$06A8,Y	230	C263	8D0806	STA	\$0608
172	C1B7	99A906	STA	\$06A9,Y	231	C266	AD5706	LDA	\$0657
173	C1BA	B9D006	LDA	\$06D0,Y	232	C269	8D3006	STA	\$0630
174	C1BD	99D106	STA	\$06D1,Y	233	C26C	AD7F06	LDA	\$067F
175	C1C0	B9F806	LDA	\$06F8,Y	234	C26F	8D5806	STA	\$0658
176	C1C3	99F906	STA	\$06F9,Y	235	C272	ADA706	LDA	\$06A7
177	C1C6	B92007	LDA	\$0720,Y	236	C275	8D8006	STA	\$0680

MACHINE CODE

237	C278	ADCF06	LDA	\$06CF	298	C30C	60	RTS	
238	C27B	8DA806	STA	\$06A8	299	C30D	AD00DC	LDA	\$DC00
239	C27E	ADF706	LDA	\$06F7	300	C310	2908	AND	#\$08
240	C281	8DD006	STA	\$06D0	301	C312	F00A	BEQ	\$C31E
241	C284	AD1F07	LDA	\$071F	302	C314	AD00DC	LDA	\$DC00
242	C287	8DF806	STA	\$06F8	303	C317	2904	AND	#\$04
243	C28A	AD4707	LDA	\$0747	304	C319	F03E	BEQ	\$C359
244	C28D	8D2007	STA	\$0720	305	C31B	4CA7C2	JMP	\$C2A7
245	C290	4C07C3	JMP	\$C307	306	C31E	AD91C3	LDA	\$C391
246	C293	AD93C3	LDA	\$C393	307	C321	F029	BEQ	\$C34C
247	C296	D001	BNE	\$C299	308	C323	4A	LSR	A
248	C298	60	RTS		309	C324	D009	BNE	\$C32F
249	C299	AD00DC	LDA	\$DC00	310	C326	8D91C3	STA	\$C391
250	C29C	2904	AND	#\$04	311	C329	A901	LDA	#\$01
251	C29E	F00D	BEQ	\$C2AD	312	C32B	8D93C3	STA	\$C393
252	C2A0	AD00DC	LDA	\$DC00	313	C32E	60	RTS	
253	C2A3	2908	AND	#\$08	314	C32F	8D92C3	STA	\$C392
254	C2A5	F030	BEQ	\$C2D7	315	C332	C902	CMP	#\$02
255	C2A7	A901	LDA	#\$01	316	C334	D008	BNE	\$C33E
256	C2A9	8D93C3	STA	\$C393	317	C336	A906	LDA	#\$06
257	C2AC	60	RTS		318	C338	8D90C3	STA	\$C390
258	C2AD	AD91C3	LDA	\$C391	319	C33B	4C46C3	JMP	\$C346
259	C2B0	F018	BEQ	\$C2CA	320	C33E	8D92C3	STA	\$C392
260	C2B2	4A	LSR	A	321	C341	A907	LDA	#\$07
261	C2B3	D006	BNE	\$C2BB	322	C343	8D90C3	STA	\$C390
262	C2B5	8D91C3	STH	\$C391	323	C346	A900	LDA	#\$00
263	C2B8	4CA7C2	JMP	\$C2A7	324	C348	8D93C3	STA	\$C393
264	C2BB	8D92C3	STA	\$C392	325	C34B	60	RTS	
265	C2BE	8D90C3	STA	\$C390	326	C34C	A900	LDA	#\$00
266	C2C1	CE90C3	DEC	\$C390	327	C34E	8D8EC3	STA	\$C38E
267	C2C4	A900	LDA	#\$00	328	C351	A900	LDA	#\$00
268	C2C6	8D93C3	STA	\$C393	329	C353	8D8FC3	STA	\$C38F
269	C2C9	60	RTS		330	C356	4CA7C2	JMP	\$C2A7
270	C2CA	A901	LDA	#\$01	331	C359	AD91C3	LDA	\$C391
271	C2CC	8D8EC3	STA	\$C38E	332	C35C	C904	CMP	#\$04
272	C2CF	A907	LDA	#\$07	333	C35E	F02A	BEQ	\$C38A
273	C2D1	8D8FC3	STA	\$C38F	334	C360	C900	CMP	#\$00
274	C2D4	4CA7C2	JMP	\$C2A7	335	C362	F016	BEQ	\$C37A
275	C2D7	AD91C3	LDA	\$C391	336	C364	0A	ASL	A
276	C2DA	C904	CMP	#\$04	337	C365	8D92C3	STA	\$C392
277	C2DC	F009	BEQ	\$C2A7	338	C368	C904	CMP	#\$04
278	C2DE	C900	CMP	#\$00	339	C36A	D006	BNE	\$C372
279	C2E0	F00C	BEQ	\$C2EE	340	C36C	8D90C3	STA	\$C390
280	C2E2	0A	ASL	A	341	C36F	4C46C3	JMP	\$C346
281	C2E3	8D92C3	STA	\$C392	342	C372	A906	LDA	#\$06
282	C2E6	8D90C3	STA	\$C390	343	C374	8D90C3	STA	\$C390
283	C2E9	CE90C3	DEC	\$C390	344	C377	4C46C3	JMP	\$C346
284	C2EC	C900	CMP	#\$00	345	C37A	A901	LDA	#\$01
285	C2EE	D011	BNE	\$C301	346	C37C	8D91C3	STA	\$C391
286	C2F0	A901	LDA	#\$01	347	C37F	8D92C3	STA	\$C392
287	C2F2	8D91C3	STA	\$C391	348	C382	A907	LDA	#\$07
288	C2F5	8D92C3	STA	\$C392	349	C384	8D8FC3	STA	\$C38F
289	C2F8	A900	LDA	#\$00	350	C387	8D90C3	STA	\$C390
290	C2FA	8D8FC3	STA	\$C38F	351	C38A	4CA7C2	JMP	\$C2A7
291	C2FD	8D90C3	STA	\$C390	352	C38D	C7	BYT	\$C7
292	C300	60	RTS		353	C38E	00	BRK	
293	C301	A900	LDA	#\$00	354	C38F	00	BRK	
294	C303	8D93C3	STA	\$C393	355	C390	00	BRK	
295	C306	60	RTS		356	C391	0101	ORA	(\$01.X)
296	C307	AD93C3	LDA	\$C393	357	C393	00	BRK	
297	C30A	D001	BNE	\$C30D					

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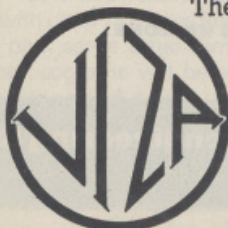
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Printer

Hewlett-Packard's model 2934A is a newsletter quality printer. It costs £2,327 and, with the IEEE 488 interface option, it is compatible with the Commodore 8000 series.

Capable of three printing speeds; 40, 60 and 200 cps, it can produce dot addressable graphics. Nine type styles are available with plug-in cartridges and print enhancements include justification, centring and proportional spacing. The normal line length is 136 characters, but this can vary from 68 to 223. Underlining and three character 'pitches can be used for emphasis. Data receive rates are selectable up to 19,200 baud.

Contact: Rapid Recall Ltd, Rapid House, Denmark Street, High Wycombe. Tel: 0494 26271.

Adcomp

Adcomp (UK), a subsidiary of Adcomp GmbH of Munich, are now responsible for the distribution of Adcomp products in the UK.

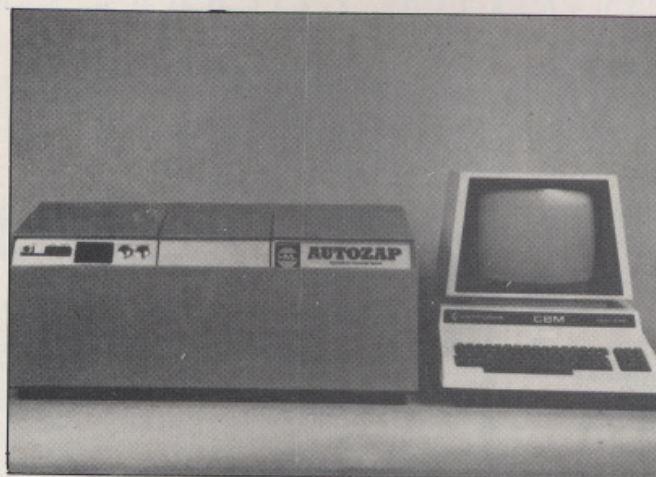
Hard disk systems for Commodore computers and a colour printer/plotter are their main products. The AP18 hard disk was originally distributed by IMI Computing Ltd.

Contact: Adcomp (UK) Ltd, 56 Long Street, Dursley, Glos. Tel: 0453 46496.

Expand

To complement their 160K expansion board for the 8000 series, SM Software will be introducing and negotiating new 160K software. SM-Text 160 with up to 1100 lines free for text plus some other famous name programs will be available in the near future.

Contact: SM Software, Raglan House, 56 Long Street, Dursley, Glos. Tel: 0453 46065.



Test ESD sensitivity

Anyone anxious to test ESD sensitivity in their semi conductors will be interested in the Autozap 200. It is software controlled and runs on the 8032.

The latest model range is the series 326 which can be used as complete DC supplies for medium precision applications or as pre-regulators in high precision DC supplies for transmitters, high power lasers

and X-ray systems for example. Safety features such as an external interlock circuit for customers, door and panel interlocks and AC supply interlocks are incorporated. They cost about £13,500 each.

Contact: Hartley Measurements Ltd, Unit 4, Bear Court, Daneshill East, Basingstoke, Hants RG24 0QT. Tel: 0256 56695.

Database

Saxon Computing have released Figaro 64, a numeric database system for the 64, on disk and priced at £86.25.

Data can be maintained and displayed in a wide variety of graphic styles including bar charts, line charts and pie charts. Text and hi-res graphics can be mixed on the screen. Features include built in statistics, calculating routines, seasonal forecasting and data security is provided by back up routines.

Saxon claim that it will be suitable for sales and marketing applications as well as more specialised fields such as biology and meteorology.

Contact: Saxon Computing, 41 Brighton Road, Godalming, Surrey GU7 1NT. Tel: 04868 4599.

On offer

Impex Designs are offering Word Manager, Plan Manager and a mail merge program for the 64 and VIC 20, free with the Video Pak 80 - an 80 column upgrade costing £145.95.

Word Manager is a word processing package and Plan Manager, a spreadsheet program can handle up to 63 columns, 245 rows and calculates to 11 digits of precision. It will perform all the basic mathematical functions and with the print option the full spreadsheet, restricted cells or just the spreadsheet model can be printed. Full use is made of the Commodore function keys in both programs.

Contact: Impex Software, Metro House, Second Way, Wembley, Middx. HA9 0TY. Tel: 01 900 0999.

Solve it

Davidson Richards have set up a service called the Communications Solution. Anyone with problems instituting a viable communications system using their equipment can get advice on what products and interfaces will be needed.

Each client is treated individually and will be advised on a package to suit them. A typical pack includes modems, software, interfaces cables. The Commodore computers can be connected to mainframes as well as mini computers.

Contact: Davidson Richards Ltd, Systems House, 29 Charnwood House, Derby DE1 2GU. Tel: 0332 383231.

Mr Chip range

Mr Chip have now moved into the business software market with the launch of an accountancy package aimed at small to medium-sized businesses. Designed for use with the 64, the seven programs making up the package can be purchased individually or as a package. Available on cassette or disk, the programs cost £25 each. For those interested in purchasing the complete package, Mr Chip are offering a saving of £35 bringing the price of the package down to £115.

The programs making up Mr Chip's accountancy package are the Accounts Package, Purchase Ledger, Sales Ledger, Sales Journal, Purchase Analysis, Sales Analysis, and Final Accounts.

Contact: Mr Chip Software, 9 Caroline Road, Llandudno, Gwynedd, North Wales. Tel: 0492 79026.

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64 Work-horses

If you're a businessman who's picked up a copy of this magazine to find some guidance about which computer to buy then read this.

Perhaps you've been pondering the advantages of having a computer which would enable you to find out quickly what would happen to your sales if you put up prices by 10 per cent. Perhaps you've been worried about the possible effects of an increase in your labour costs.

You will undoubtedly have had advice about buying computer systems that cost between £1,000 and £5,000. Pause for a while and consider the possibilities of the Commodore 64. OK cynics, you can stop sniggering now. You obviously haven't seen Microsoft's Multiplan.

It's the sort of product that pays an incredible compliment to the 64. As is obvious from the references and the illustrations in the manual, Multiplan was previously written for the Apple and it's a surprisingly big, serious business program.

The point is, of course, that to a huge degree – and especially in business – the computer is only as good as its software. Microsoft and others who have provided good quality business software for the machine have been gradually upgrading the 64 so that it becomes a genuinely inexpensive but viable alternative to bigger machines costing much more. There may be those who believe that Commodore don't really deserve it. But they did produce the 64 in the first place!

It seems to be a huge program, marvellously flexible. This is undoubtedly due to the program's use of the disk drive which seems to be constantly accessed. In spite of the notorious slow speed of the 1541 the program did not seem to be slowed down at all. It's difficult to see how, in most of the tasks, anyone could wish for anything quicker.

It's been made as simple as possible but anything this big is certain to take a while to get used to and I would imagine that one would need to be using it for months to become entirely familiar with it and explore it fully.

£89.91 buys you what is probably the best spreadsheet software for the 64 on the market – you would certainly have problems finding anything similar at a similar price. Presumably if you've read this far you will know what a spreadsheet is but for new business people a spreadsheet is simply a sheet of paper with rows and columns. Accountants will know the format well. They're forever working out figures on huge sheets of squared paper which are the equivalent of Multiplan's worksheet. Where any electronic worksheet wins out over the manual method is that the electronic worksheet has an enormously powerful calculator built in – change one number on the sheet and all the other figures which may be affected will change before your very eyes! Change the figure in the costs column, for instance, and you'll see how your profits will be affected. Such a tool has obvious uses in forecasting and planning.

Multiplan is described as a worksheet but spreadsheet might be a more familiar word for many business users. Imagine a huge sheet of paper 255 rows deep and 64 columns wide. That's the total extent of one Multiplan worksheet. But the screen of your 64 only acts as a window on to part of that at a time – a part that's four columns wide and 18 rows deep. On the original Apple version the window is seven columns wide and 20 rows deep.

Why is Multiplan different from other spreadsheets? It has tremendous flexibility. You can, for instance, connect and disconnect worksheets. You can even view parts of different worksheets on the same screen.

The size of the 64's memory is obviously one of the main reasons why Microsoft felt able to adapt Multiplan for the 64. But Multiplan may still surprise you with its size. It's fine having a marvellously sophisticated program but what if it takes up too much of the computer's memory? Such a business

program would leave you no room for work. One of the ways that Microsoft get over this is by accessing the disk – a request for Help, for instance, sets the drive whirring busily. In fact, Multiplan takes up 437 blocks on the disk (leaving 227 free for your own files).

The big test of any software is, of course: Does it work? The first time I used it something went very wrong. A row of !!!!!!! appeared instead of numbers after I had attempted to give values to all numbers. But I'm quite prepared to admit that it was all my fault since Multiplan worked without a hitch on all other occasions.

Multiplan may seem daunting at first but is very user friendly once you know your way round it. An enormous amount of work has been put into making it as simple as possible. It's not quite idiot proof but one of its great advantages is that you don't necessarily have to be familiar with computers to use it. The documentation is a tremendous help – it is some of the best that we've seen. There are 187 pages of tutorial and 238 pages of reference. It explains clearly and simply what is happening and what you need to do to make something else happen. The 'HELP' file of Multiplan is available all the time and will give you the appropriate advice for the part of the program in which you're stuck so there's no need to go through a whole file before finding the right place.

One of the most impressive aspects of Multiplan is the obvious effort that Microsoft have made to produce something of quality.

Even the perspex case it comes in can be converted into an 'EaselBox' – with the top folded down it's a bookstand to support the manual or the top can be removed to form a separate bookstand while the box can be used for storage. The EaselBox idea shows what thought has been put into the product.

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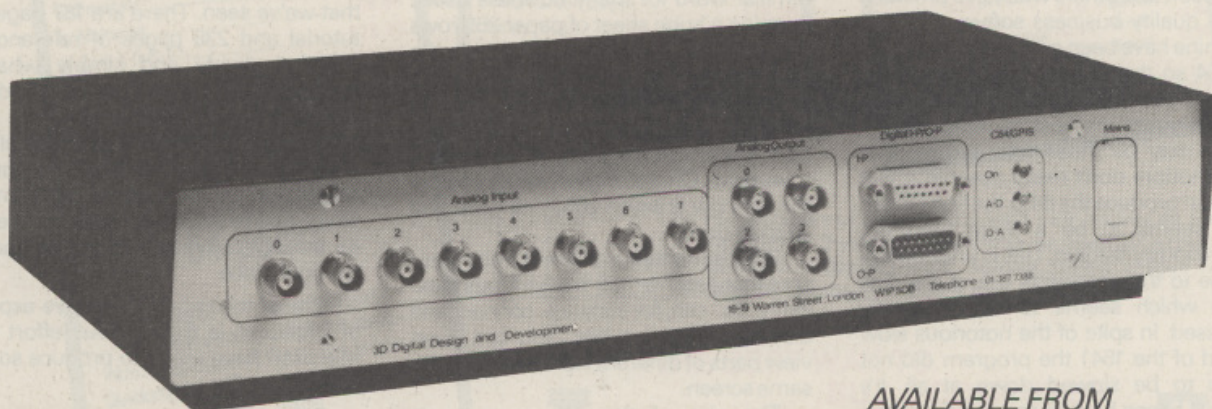
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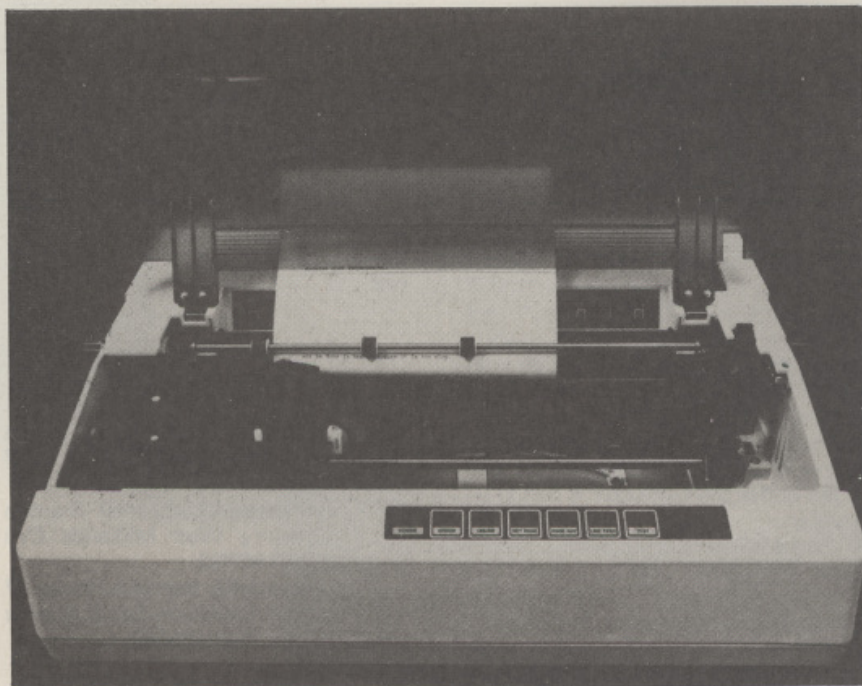
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Cheap but not nasty

This month we look at Keyaki's daisy wheel printer and find that despite its low cost it retains all necessary features



The Daisy Step 2000 claims to be a fully-featured low cost daisy wheel printer and we could find nothing to contradict that. The only drawback with this version is that an interface will be needed and the additional cost will have to be considered if you are thinking about budgets. It produces very good quality print outs and although it isn't one of the faster daisy wheel printers on the market, 18 cps isn't slow. It is also quiet which is an advantage in a work

environment.

The push buttons on the panel at the front of the printer are touch sensitive and the four indicators turn red to indicate if the power is on, if there is an error, if the printer is ready to accept information and also when the test routine is being run. The other three controls clear the line counter, set the top of the form (TOF), feed the next piece of paper to the TOF and advance the paper line by line. The controls needed to

select the distance between each line, the length of page, the character size and the strength or print are located in the DIP switch at the back of the printer.

With this printer many of the controls will only work if you are using software that recognises them. For instance the printer can cope with the following features but needs to be programmed: subscripts and superscripts; horizontal and vertical tabs and proportional spacing.

The printer is accompanied by manual, print wheel, ribbon cartridge and a power cable. It proved exceptionally easy to fit the daisy wheel and ribbon cartridge – a bonus if you are used to complicated ribbon loading mechanisms. It can print up to four copies and there is an optical tractor feed mechanism or single sheet feeder available for the printer.

The Daisy Step 2000 is worth considering if you or your business needs good quality print for letters and other word processing applications. It is also comparatively easy to use.

N.B. IBEK Systems are producing a 64 version of this printer and it is due for release at the end of April for about £319. There are a few features especially developed for the 64, for example Commodore normal programmable listing codes will be translated by the printer as readable English codes ([CR] for cursor right)

Contact: IBEK Systems, 437 Stoney Stanton Road, Coventry, West Midlands CV6 5EA. Tel: 0203 661162.

Product Name:
Daisy Step 2000

Product:
Daisy wheel printer

Supplier:
Keyaki Ltd, Enterprise House, 42-44
Terrace Road, Walton-on-Thames
KT12 2SD Tel: 0932 242777

Specifications:
Speed: 16 cps

Uses Qume ribbons and daisy wheels
Bidirectional logic seeking printing
12, 14 and 18 cpi
120, 144 and 180 cpl
13 inch maximum paper width

Software controlled proportional
spacing
4 levels of impression control
Copy capacity: original and 4 copies
Friction platen paper feed

Interface options:
8-bit parallel Centronics
RS 232 C
12-bit parallel

Applications:
Word processing

Documentation:
Detailed manual written in English,
German, French and Spanish

Price:
£289 = VAT

Buffer them up

In this month's product survey we look at a selection of printer buffers which enable you to continue using your computer while printing out

Anyone with a printer will understand the frustration of standing around staring at the screen while the printer is busy producing hard copy. The computer is effectively redundant while the printer is in use – not such a problem for the home user perhaps, but a real headache for many businesses.

This is where the printer buffer comes in. All the data waiting to be printed is stored in the buffer's RAM in seconds, freeing the computer and other equipment for other tasks. The buffer then feeds the data to the printer so it can print at its own pace.

In the old days people who wanted a fast printer chose dot matrix, but in doing so often sacrificed the letter quality of the slower daisy wheel. The Commodore 1361 dot matrix operates at 150 cps (characters per second) whereas the daisy wheel Commodore 6400 runs at 40 cps. With a printer buffer installed between the printer and any of the Commodore computers, the printer's speed is largely irrelevant.

Printer Buffers are available in two forms: standalone and on a printed circuit board which slots into the back of the printer. Most of the board buffers are designed for the Epson printers. Not all printers are directly compatible with Commodore and a lot of them have Parallel Centronics or RS232C interfaces, so if you are thinking of investing, check that the printer buffer has the appropriate specifications. For instance if you have a Pet and a parallel printer you will need an IEEE to Parallel buffer.

Some printers have a buffer of up to 16K built in, but there are some disadvantages with these. Pressing the button on the printer has no effect until the buffer is empty, so if the paper jams, the information still has to be printed out and the text re-run to get a perfect copy. Printer interfaces often have a buffer function attached to them, whereas the printer buffer has a small interfacing capability.

The size of the buffer's memory

varies – the larger the memory the more text can be stored before being printed out. A 2K buffer will only store 2,000 characters (400 words if you take the average word length to be five characters long) whereas a 32K buffer can hold up to 32,000 characters (6,400 words). Buffers can usually be expanded by attaching additional memory.

In most business situations, time is money and it is advantageous to get things done quickly. However, anyone with a printer will prefer to get on with the job right away rather than hang around wasting time. Printing out 32,000 characters on a 160 cps printer would normally take about 17 minutes, but with a 32K buffer, the computer is free in 64 seconds!

Some of the buffers have a secondary addressing function and this enables the printer to deal with programs requiring more than 256 different characters on the print out. Most of the

ready made business software will not need to use it, but Commodore's own software, educational and scientific software and also programs that people have written themselves will benefit from this facility.

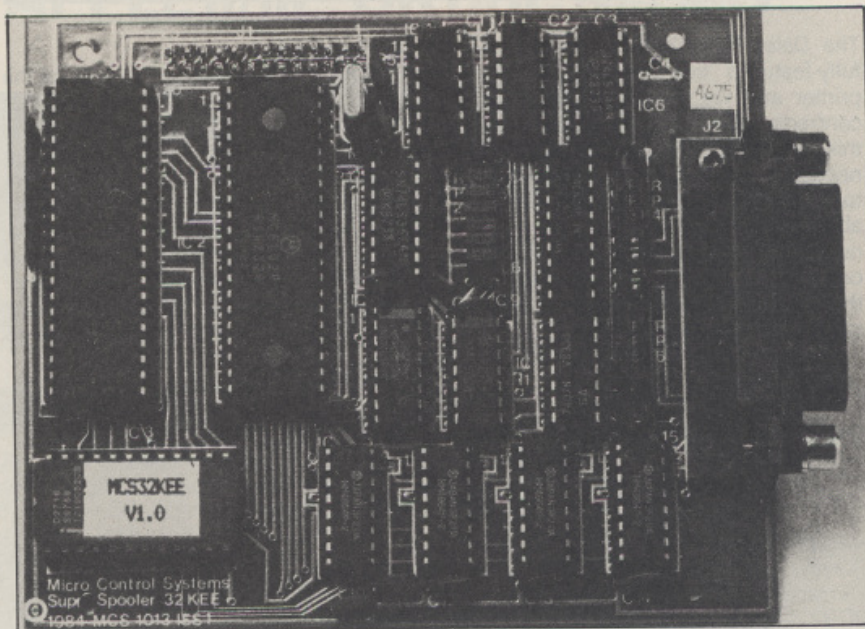
Some of the buffers in the survey will need interfaces as they are not compatible with Commodore machines without one.

A-Line: 1 Church Farm Lane, Willoughby Waterleys, Leicestershire LE8 3UD. Tel: 053 758 48.

Duplex Communications: 52 High Street, Stock, Essex CM4 9BW. Tel: 0277 841011.

IBEK Systems: 437 Stoney Stanton Road, Coventry, West Midlands CV6 5EA. Tel: 0203 661162.

Interface Systems: Interface House, 17 Eversley Road, Bexhill-on-Sea, E. Sussex TN40 1HA. Tel: 0424 225683.

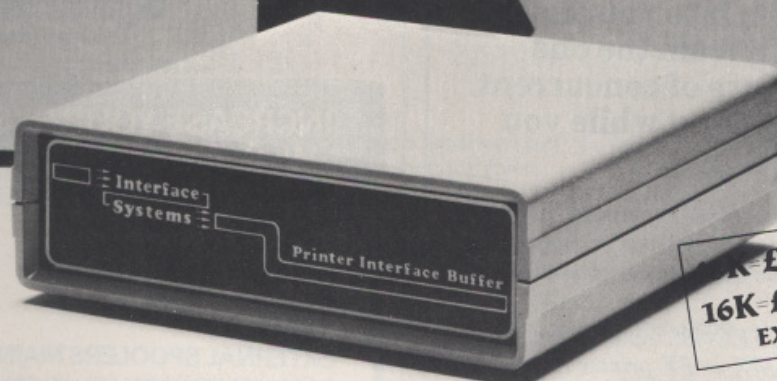


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PRODUCT SURVEY

Printer Buffer	II4048	IC5048
Manufacturer/ Supplier	Interface Systems	Interface Systems
Memory	16K, 48K and 96K	16K, 48K and 96K
Specifications	IEEE – IEEE	IEEE – Centronics
Features	Primary addressing Secondary addressing Dimensions: 5x 5.25 x 1.5 inches	Primary addressing Longer cables Dimensions: 5x 5.25 x 1.5 inches
Standalone/ Board	Standalone	Standalone
Interface	–	–
Price	£125, £158 and £243	£125, £158 and £243
Printer Buffer	Dial-Text 50	BIF 1110, 11, 12 and 13
Manufacturer/ Supplier	Duplex Communications	IBEK Systems
Memory	16K	8K, 16K, 48K and 96K
Specifications	RS 232 C – RS 232 C	IEEE – IEEE
Features	Connects to an acoustic coupler and can transmit text over the telephone line to remote printers (via another dial-text unit) Error detection and correction Stores messages on cassette unit Requires a RS 232 C printer	Secondary addressing Scheduled to be ready beginning of May
Standalone/ Board	Standalone	Standalone
Interface	Pet: IEEE converter CBM 64: RS 232 level converter	–
Price	£495	£199, £219, £249 and £289
Printer Buffer	BIF2220, 21, 22 and 23	BIF2210, 11, 12 and 13
Manufacturer/ Supplier	IBEK Systems	IBEK Systems
Memory	8K, 16K, 32K and 64K	8K, 16K, 32K and 64K
Specifications	Parallel – Epson Printer	Parallel – parallel
Features	Specifically for the Epson printers and fits into a slot inside	–
Standalone/ Board	Board	Standalone
Interface	Requires CBM64/VIC20 to Parallel interface. IBEC price for IF4210: £59.95	Requires CBM64/VIC20 to parallel interface. IBEC price for IF4210: £59.95
Price	£59.95, £69.95, £79.95 and £109.95	£79.95, £89.95, £99.95 and £129.95

PRODUCT SURVEY

Printer Buffer	Super Spooler E/Buffer	Sprint Buffer
Manufacturer/ Supplier	A-Line Computer Systems	A-Line Computer Systems
Memory	16K, 32K and 64K	65K
Specifications	IEEE – Epson printer	IEEE – IEEE, Parallel and RS 232 C versions
Features	Designed to fit any of the Epson printers: MX, RX and FX Allows use of printer lower case characters	Self Test Dimensions: 11.7 x 8 x 4 inches
Standalone/ Board	Board	Standalone
Interface	–	–
Price	£105, £135 and £185	£350 for IEEE – IEEE £368 for IEEE – RS 232 C and Parallel versions

Printer Buffer	TAII	Sprinter
Manufacturer/ Supplier	A-Line Computer Systems	A-Line Computer Systems
Memory	64K	2K, 16K and 32K
Specification	IEEE-IEEE	IEEE – IEEE, Parallel or RS 232 C.
Features	Unidirectional Reset and pause control	6 ports Compatible with RS 232 C, Parallel or IEEE printers Dimensions: 30cm x 20cm x 9.5cm
Standalone/ Board	Standalone	Standalone
Interface	–	–
Price	£350	£175, 195 and £245

Printer Buffer	TAIRS	TAIP
Manufacturer/ Supplier	A-Line Computer Systems	A-Line Computer Systems
Memory	63K	64K
Specification	IEEE – RS 232 C	IEEE – Parallel Centronic
Features	Unidirectional Pause and reset controls Compatible with RS 232 printer 31K: Storage on input and output	Pause and reset controls
Standalone/ Board	Standalone	Standalone
Interface	–	–
Price	£350	£368

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CLASSIFIED

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Listings for '64'. Send tape and £1.60 to Chaparall 12 Hollybank Gdns. Hastings – Evenings 436522 about disks and print-outs.

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PET games at amazing prices. Arcade games 50p – £1.50. Send s.a.e. for literature to Stephen Gray, 20 High Chase Rise, Little Haywood, Nr. Stafford ST18 0TY.

Commodore 1520 printer plotter, pens, paper, manual, £80. (0932) 241242.

Wanted – good original programs in 'Basic' and M/C for the CBM64. We are interested in games, adventure, utilities, home management and business. Please send your examples to Pickle Software, 59 Forge Lane, Higham, Kent ME3 YAH.

Wanted – complete Commodore 3000 series system: 3032 computer, 3001 double disk drive, 3022 tractor printer. Contact: Mr. B. Horsler, SFK (UK) Ltd. Tel: 0582 55977.

Commodore 64 looks for other CBM 64s to exchange tips and programs (already 350 excellent softwares). Alain, P.O. Box No. 116, Liegex, Belgium.

VIC 20 Computer, super expander, Vicmon, Eprom programmer, 24K RAM pack, tape deck, screen cartridge, RS232 interface, Rtty unit, books and lots more. Ring 01-855 3894, £220 o.n.o.

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Commodore 64 Home Finances Program interactive budget and current accounts. Full instructions included. S.A.E. for full details. Send cheque or P.O. for £7.50 to D. Watts, 17 Brockridge Lane, Frampton Cotterall, Bristol BS17 2HU.

Educational Software. Tape 1 – unexpanded VIC 20 for 8-14 years: addition, subtraction, multiplication, division, tables, spelling, English/French, general knowledge. Tape 2– 16K: Adventures, Time Slip and Treasure Island. Each tape £6 or £10 both. G. Saunders, 22 Front Street, Guide Post, Northumberland NE62 5LT.

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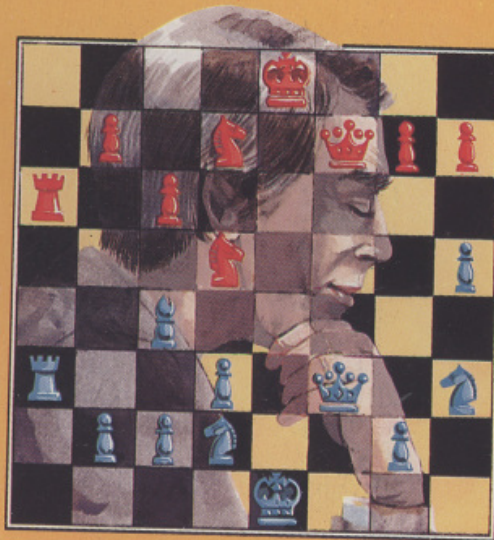
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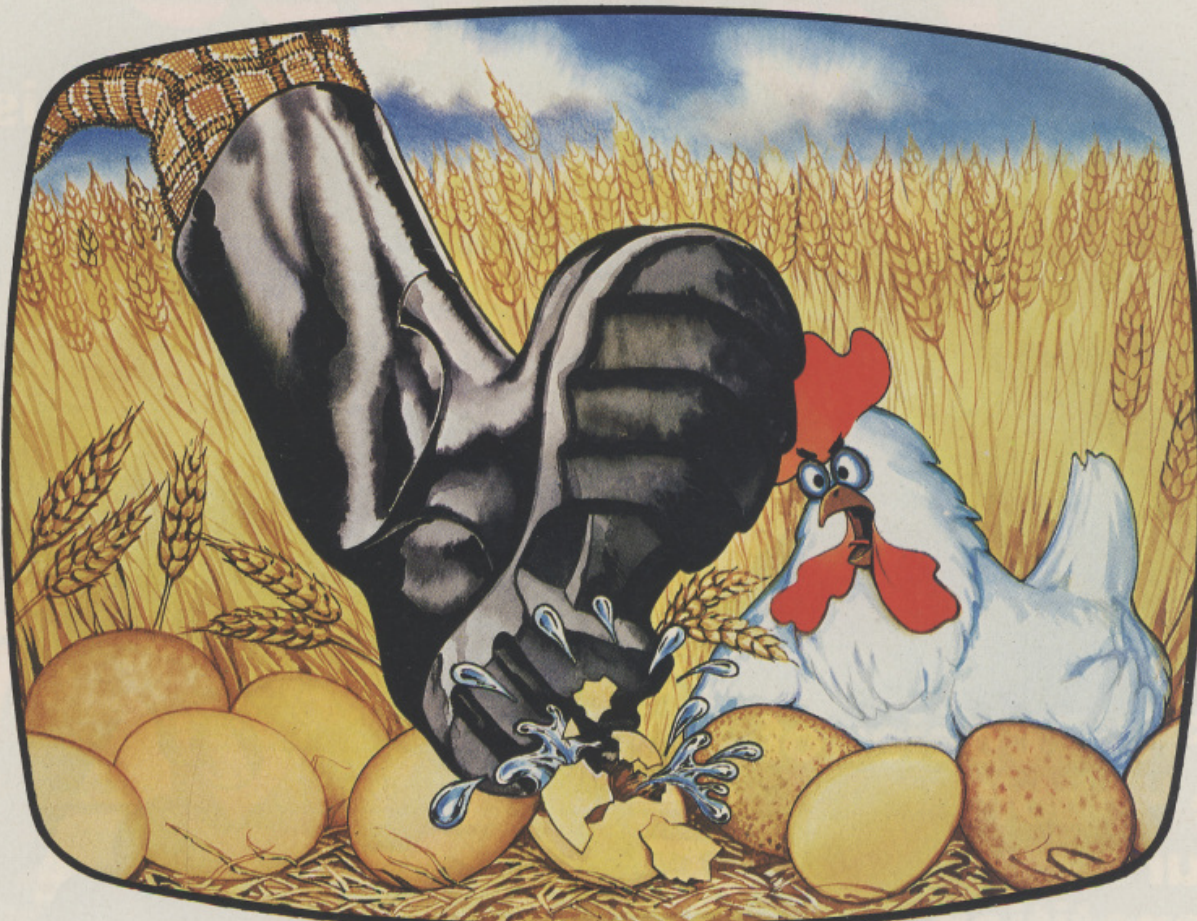
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Reviews

Inside a Game



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Creative Sparks

Thorn EMI Computer Games have released a number of new titles with the creation of their new label, Creative Sparks.

There are two new games for the 64, both requiring joysticks. Slurpy is a cave-dwelling creature with an enormous appetite, and Black Hawk is an action game with a strategic element. Both cost £7.75.

For the unexpanded VIC there are two cartridge games costing £9.95. In Mine Madness you have to retrieve the treasure and in Mutant Herd your task is to protect the powerhouse from crazy mutants.

Three new games for the VIC require 8K RAM expansion. Available on cassette at £5.95, they are the action games Tower Of Evil, Tank Commander and Computer War – which is based on Thorn EMI's recent film War Games.

Finally there is Submarine Commander, an action game spread over three screens with scrolling in periscope mode. Costing £5.95, Submarine Commander is available on cassette and requires 16K RAM.

Contact: Creative Sparks, Thomson House, 296 Farnborough Road, Farnborough, Hants. Tel: 0252 543333.

On the run

CRL's Omega Run is now available for the 64. Written by Richard Brisbane, the aim of the game is to guide your plane through enemy territory and destroy a base containing a doomsday device which has been captured by terrorists.

Available through traditional retail outlets and mail order, Omega Run costs £7.95.

Contact: CRL, CRL House, 9 Kings Yard, Carpenter's Road, London E15 2HD. Tel: 01-533 2918.

In-house team for Virgin

Virgin Games are taking a step further from being just a software publisher with the creation of a small team of in-house programmers to develop 'unique creative' software. This expansion of operations does not mean the end of Virgin's publishing activities: the company are still offering their international sales and marketing network to other software houses who don't have the financial resources to do so themselves.

In the 12 months since the formation of Virgin Games, the company have released 40 computer game titles, securing four per cent of the software market. Ambush is the latest Virgin title for the 64. Costing £7.95, it's an arcade action game featuring a spaceship and attacking mutant aliens.

Contact: Virgin Games, 61/63 Portobello Road, London W11 3DD. Tel: 01-221 7535.

Campaign

Boots are joining with Visions Software Factory to promote Demolator, a 64 compatible arcade game. It costs £6.95 and the promotion campaign which started in mid-April will run for six weeks.

Contact: Visions (Software Factory) Ltd, 1 Felgate Mews, Studland Street, London W6 9JT. Tel: 01-748 7478.

New software from Commodore

Commodore have launched a new batch of software.

Tony Hart – Art Master, for the 64, costs £9.99 (cassette or disk) and enables you to draw, colour and save your pictures in high resolution.

New Commodore disk games for the 64 are Rail Boss and two adventure games – Zork I and Zork II. All three cost £11.99.

And finally for the 64 is Wizard of Wor. Available on cartridge at £9.99, this two-player game talks and simulates all the features of the arcade game.

For the unexpanded VIC, Commodore have launched

two cassette games, both at £4.99. They are Sir Hero and Rapier Punch.

Music Writer is for the expanded VIC and allows you to create, edit and save music in conventional notation. It costs £4.99 and is available on cassette.

Also on cassette for the expanded VIC at £4.99 are Nursery Rhymes and Stop Thief which uses the computer's identikit to create the burglar's face.

Contact: Commodore, 675 Ajax Avenue, Slough, Berks. Tel: 0753 79292.

Hobbit guide

In response to the phenomenal success of Melbourne House's The Hobbit, the company have published "A Guide to Playing the Hobbit".

It helps to improve the understanding of the game and anyone from a complete beginner to an advanced adventurer will benefit. The book is divided into three sections: section one gives broad outlines on the general strategies and tactics in the game, and sections two and three offer more guidance together with detailed solutions to problems that may be encountered. It retails at £3.95 and is available in most bookshops.

Contact: Melbourne House (Publishers) Ltd, Castle Yard House, Castle Yard, Richmond TW10 6TF. Tel: 01-940 6064.

Infidel

Infidel, the first game in the Infocom Tales of Adventure Series, is now available from Softsel for the 64. It comes on cassette for £35.95.

Set in the Egyptian desert, the player has to find the buried entrance to a pyramid and seize the treasures inside. A number of additional games pieces are included such as a manual of sorts, a map of the Nile river Valley and a hieroglyphics dictionary.

The creator of this epic adventure is Michael Berlyn and the game also features Interlogic so that players can use sentence commands with the aid of a 600-word vocabulary.

Contact: Softsel Computer Products, Softsel House, Central Way, Feltham TW14 0XQ, Middx. Tel: 01-844 2040.

Welcome to this, the first issue of Commodore Games. This is planned to be a regular monthly supplement to Commodore Computing International, concentrating solely on games for Commodore machines. We'll be looking at all aspects of all sorts of games – publishing new ideas, reviewing games, answering your queries and bringing you all the latest games news. So if you feel you have anything to contribute or have any queries – whether about routines for arcade games or a bit of help in an

adventure game – write to us at Commodore Games, 167-169 Great Portland Street, London W1. By the way, we pay for contributions.

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DUCKWORTH HOME COMPUTING

CBM-64 PROGRAMS 1 edited by Nick Hampshire

This book provides the reader with useful and interesting programs for the 64. Topics covered include: Hi Res Graphics – Music – Games – Utilities – Sprites and User Defined Characters – Functional Programs, etc. There is a detailed explanation of Hi Res Graphics and the necessary machine code routines to implement them, along with demonstration programs. An exciting version of Star Trek is included as well as a full length adventure game. Among the functional programs is a Personal Information Retrieval package which enables you to create and manipulate up to 365 records.

Nick Hampshire is the publisher of *Commodore Computing International*.

£6.95

SPRITES & SOUND ON THE COMMODORE 64 by Peter Gerrard

A comprehensive guide to using the extraordinary features of the Commodore 64, together with a full working explanation of the chips that make it possible: the 6581 Sound Interface Device and the 6566 Video Interface Chip, together with the processor that makes it all tick, the 6510.

Sections on programming your own musical instruments, producing sprite and programmable character animation, make this the guide for users of the Commodore 64 who want to get the most from the special features of their computer.

Peter Gerrard, former editor of *Commodore Computing International*, is a regular contributor to *Personal Computer News*, *Which Micro?* and *Software Review*, and *Commodore Horizons*.

£6.95

EXPLORING ADVENTURES ON THE COMMODORE 64 by Peter Gerrard

A complete look at the fabulous world of Adventure Games for your computer. Starting with an introduction to adventures, and their early history, it takes you gently through the basic programming necessary before you can start writing your own games.

Inputting information, room mapping, movement, vocabulary, and everything required to write an adventure game are explored in detail. There follow a number of scenarios, just to get you started, and finally three complete listings written especially for the 64, which will send you off into wonderful worlds where almost anything can happen. The three games listed in the book are available on one cassette at £7.95. The complete guide to adventure games: playing, writing and solving them. Peter Gerrard is the author of Romik's two top-selling adventure games — Fools Gold and Tomb of Xeiops.

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EXPLORING ADVENTURES ON THE VIC by Peter Gerrard

As above but for the VIC. Two of the games require 16K expansion and the third 32K. A cassette containing all three games is also available at £7.95

£6.95

THE COMPLETE 64 ROM DISASSEMBLY by Peter Gerrard and Kevin Bergin

This book is for anyone who has ever wondered how the Commodore 64 really works. Intended for the serious programmer, it includes fundamental memory maps, memory architecture maps, the disassembly itself and (for reference) the complete 6510 machine code instruction set.

Kevin Bergin is a regular contributor to *Personal Computer News*, *Commodore Horizons*, *Which Micro* and *Popular Computing Weekly*.

£5.95

THE COMPLETE VIC ROM DISASSEMBLY by Peter Gerrard and Kevin Bergin

As above but for the VIC.

£5.95

A POCKET HANDBOOK FOR THE COMMODORE 64 by Peter Gerrard and Danny Doyle

This book contains all the vital information you will need when using your 64. There are sections on: ASCII tables – Basic keywords – Basic error messages – Colour memory – Conversion tables – Disk commands – Disk error messages – Disk formats – Extramon listing – Flow charting – Hex/Dec convertor – Hyperbolic functions – Memory maps – Memory architecture – M/C instruction set – M/C mnemonics – Powers tables – Cartridge standards – Other output – Screen memory – Sound chip registers – Musical notes values – Sprite memory diagram. In short, everything you need to know about your machine.

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A POCKET HANDBOOK FOR THE VIC by Peter Gerrard and Danny Doyle

As above but for the VIC.

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DUCKWORTH

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Slinky vs Slurpy

A selection of recently-released arcade games for the VIC and the 64 designed to test your reflexes

FLYING FEATHERS

In Flying Feathers a fisherman must shoot eagles as they swoop down and try to carry his fish away.

A panel at the bottom of the screen records the number of fish left (the player gets five to start with) and the score. There are two methods of shooting the birds. With the easiest one, the hunter places a cross near the bird using the joystick or keyboard and presses the fire button to shoot. The second involves more judgement, the fire button has to be kept pressed until the shot is over the target and then released. There are four skill levels for each shooting method—eight in total.

The graphics are realistic and a duck tells you when you are awarded a bonus fish. A high score table has space for nine people. It's enjoyable to play and should appeal to the young.

Title: Flying Feathers

Programmer: Terry Owen

Company: Bubble Bus Software, 87 High Street, Tonbridge, Kent. Tel: 0732 355962.

Hardware: CBM 64, cassette player, joystick optional

Type of game: Arcade

Graphics: ****

Sound: ***

Playability: ***

Description: Shoot the eagles using two types of firing

Price: £6.99

CCI Rating: ***

CHARIOT RACE

To make the most of this game two players are needed, but it can still be enjoyed by an individual. Sinister and Dexter are the two charioteers and the aim is to reach the finishing line and push all the other chariots into the side.

Points are scored by destroying other chariots, the other player's chariot and going as fast as possible. The highest speed a chariot can go is 250 and if the chariot goes too slow, spectators throw destructive fireballs onto the track. There are twenty laps to complete and in each lap more chariots appear and start to fight back. On either side of the screen the current score and the chariots pushing power are shown. The number of laps completed, the speed and the highest score are depicted on top.

It's an exciting game and very good value.

Title: Chariots Race

Programmer: Paul Hope

Company: Micro-Antics, Little Home, Hawthorn Lane, Codsall, Wolverhampton. Tel: 0907 45147.

Type of game: Arcade

Graphics: ****

Sound: ***

Playability: ****

Description: Race chariots round twenty laps and knock rivals in to the side.

Price: £6.95

CCI Rating: ****

NURSERY NIGHTMARE

This game bears an uncanny resemblance to Egbert by Games Machine, the only difference being that this one involves a maid, a baby and a milk bottle rather than Egbert and an egg.

The screen is divided into three. In the middle lane the player manipulates the maid who has to catch the baby, drop him to cross into the outer lane, collect the bottle and dash back to catch the baby before it falls. If it does fall angry Agnes eliminates the maid. There are three lives to each game. Nursery objects present a hazard and must be avoided. There are five levels and a player can only pass into one when the first one has been successfully completed.

The joystick control is smooth and the game is quite amusing to play.

Title: Nursery Nightmare

Programmer: Alan Osborne

Company: Cable Software, 52 Limbury Road, Luton, Bedfordshire LU3 2PL. Tel: 0582 591 493

Hardware: CBM 64, cassette recorder and joystick.

Type of game: Arcade

Graphics: **

Sound: **

Playability: ***

Description: Catch the baby, pick up milk bottle and feed it.

Price: £7.50

CCI Rating: **

ARE YOU OUR MASTER GAMER?

At the Commodore Show, to be held at London's Novotel (previously the Cunard) from 7 June to 9 June, Commodore Computing International will be looking for the CCI Master Gamer—giving you a chance to prove just how good you are at playing computer games.

We will have a selection of games which have been chosen to test your skills as a games player to the full. There will be lots of prizes and an overall grand prize which will be announced in the June issue. (We want to encourage women in computing so there will be some special

prizes). Entry forms will be available in the June issue of Commodore Computing International—we will be giving priority to those with entry forms so make sure you get your June issue of Commodore Computing International by placing an order with your newsagent now.

MANIC MINER

Miner Willy has stumbled on a fortune, but to get to it he has to travel down through twenty underground caverns. The game follows the infamous Kong arcade game format with disintegrating platforms, innumerable obstacles and nasties like poisonous pansies, slime and manic mining robots. Each player gets three lives.

Each cavern has a theme – Menagerie, Abandoned Vitamin Works, Attack of the Mutant Telephones, Amoebatrions Revenge until finally the Final Barrier is reached. The screen on which the game takes place is small in comparison to the screen surface and it seems that the game is a straight conversion from the Spectrum version – a pity. The collision detection of sprites was intensive and it was almost impossible to get past the first cavern because miner Willy kept exploding.

We were slightly disappointed by this game and although it contained some nice ideas and interesting sound effects, the 64 conversion was not quite good enough.

Title: Manic Miner

Programmer: Matthew Smith (conversion by Chris Lancaster)

Contact: Software Projects, Bear Brand Complex, Allerton Road, Woolton, Liverpool. Tel: 051 428 7990.

Hardware: CBM 64, cassette recorder and optional joystick

Type of game: Arcade

Graphics: ***

Sound: ***

Playability: ***

Description: Miner Willy must travel through 20 caverns avoiding nasties to reach the fortune.

Price: £7.95

CCI Rating: ***

CHINESE JUGGLER

The graphics in this game are clever and give the game much of its appeal. Using a joystick, the player manipulates the oriental man to collect plates and place them on poles.

The graphics are so accurate that the juggler must move around obstacles and has to be in exactly the right position before picking a plate up. The plates have to be respun regularly and in each level the frequency at which they stop spinning increases. There are five colours and each one has a numeric value, for instance white is worth more points than purple. Extra points are also awarded for juggling tricks.

Once all the plates are spinning on the eight poles, a jolly musical fanfare announces the juggler's success and he is ready for the next level. The music is excellent and adds to the game's attractions. Play is against the clock and bonus points are awarded for completing each level within the time frame. There are ten levels to complete.

The game is amusing and it is not difficult to attain a reasonable standard quickly. In fact it is perhaps too easy. We managed to get a score which almost outgrew the available space!

Title: Chinese Juggler.

Programmer: Hungarian author.

Company: Ocean Software Ltd, Ralli Building, Stanley Street, Manchester. Tel: 061 832 9143.

Hardware: CBM 64, cassette player and joystick.

Type of game: Arcade.

Graphics: *****

Sound: *****

Playability: *****

Description: Simultaneously balance eight spinning plates within a time limit.

Price: £6.90

CCI rating: *****

MR WIMPY

Mr Wimpy is based on the unlikely theme of making good hamburgers and is divided into two parts.

In the first part Mr Wimpy has to assemble the burger ingredients and to do so he has to cross the screen with a tray and collect the bread, ham and cheese. Manholes and burger thieves have to be avoided. Once they have all been successfully collected, the burgers have to be made. In the kitchen, Mr Wimpy has to make four burgers by freeing the ingredients – two bun halves, cheese, lettuce and ham in order from the four levels so that they fall into a pan at the bottom.

Kitchen rebels – eggs, pickles, sausages chase him, but he can throw pepper to defend himself, but there are only three chances unless he picks up the bonus gems, ice-cream or coffee which give him an extra chance to shoot. The screen shows the current score, highest score, number of lives left (there are three per game) and the number of peppers left.

Joystick control is sensitive, the graphics are colourful and fun and the

screen scrolling is smooth. A very good game.

Title: Mr Wimpy

Programmer: David Selwood

Company: Ocean Software Ltd, Ralli Building, Stanley Street, Manchester M3 5FD

Hardware: CBM 64, cassette recorder, joystick optional

Type of game: Arcade

Graphics: *****

Sound: **

Playability: *****

Description: Guide Mr Wimpy in his task to make the best hamburgers in town

Price: £6.90

CCI Rating: *****

BLACK HAWK

Conceived during the Falklands, the idea of this game is to guide the Black Hawk (the world's deadliest aircraft) across enemy territory to liberate a small group of islands. To get the most from this game you are advised to read the instruction leaflet very carefully. In theory, it is fairly complicated game with different weapons being made available to you as your score progresses. Unfortunately Black Hawk does not live up to expectations in practise.

Your plane is fitted with an on-board computer, with dual attack and defence screens. All this means is that the sprite changes.

The game suffers from an apparent lack of thought concerning the graphics. It's hard to take things seriously when tanks appear from out of the sea and when the scenes change so much that at one moment you are on the edge of water, but in the next instance it has gone. It is also irritating in the early stages of the game when each attack is broken up by the appearance of the introductory screen.

Title: Black Hawk

Programmer: Dean Lock

Company: Creative Sparks, Thomson House, 296 Farnborough Road, Farnborough, Hants. Tel: 0252 543333

Hardware required: 64, cassette recorder, joystick

Type: Action/strategy

Graphics: **

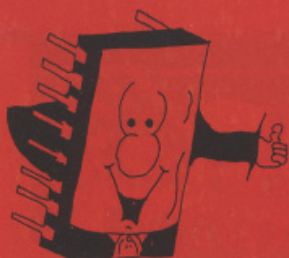
Sound: **

Playability: **

Description: Aircraft mission to liberate small group of islands

Price: £7.95

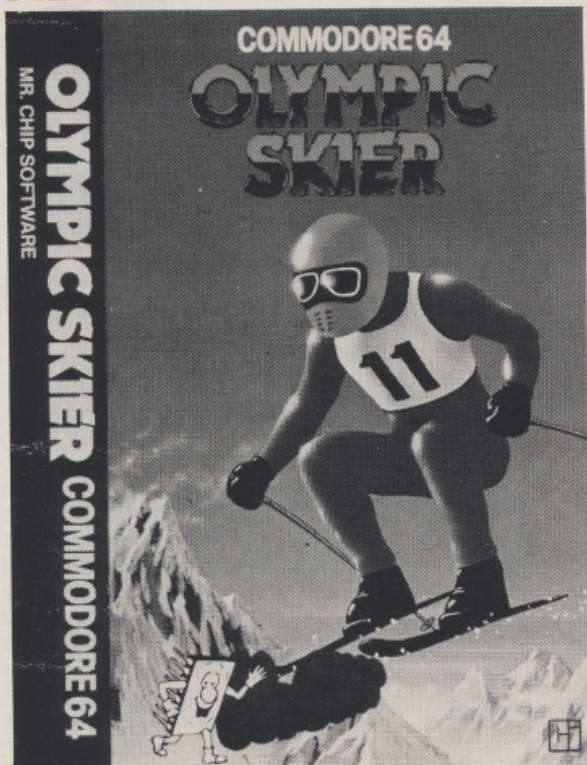
CCI rating: **



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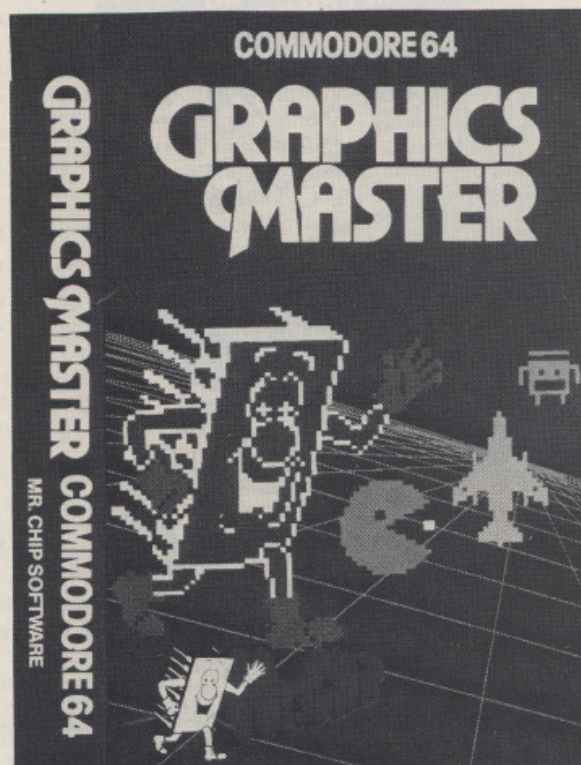
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NEW For the Commodore 64

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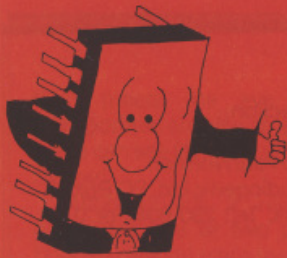
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AZTEC CHALLENGE

A test of endurance – an Aztec warrior must prove himself by running and jumping through a series of levels beset with danger. Using the joystick, the player guides the warrior through each of the seven levels – the gauntlet, stairs, temple, vermin, tiles, piranha and finally the bridge.

Dangers include falling spears, cracks in the floor, spiked tiles and piranhas. The graphics, colour and sound are excellent and the warriors hair rises every time he jumps. On each level the music changes and the size of the buildings indicates how advanced the warrior is in completing the level.

Once the player has successfully completed all seven levels he automatically goes onto the next phase of difficulty where the action is much faster. There are four phases in total. Two players can play and each level offers five lives, once the next level is achieved the game restarts at the same level. Aztec Challenge is as its title suggests an excellently challenging game.

Title: Aztec Challenge

Programmer: Paul Norman

Contact: Audiogenic Ltd, PO Box 88, Reading, Berks. Tel: 01-290 6044 or 0734 586334

Hardware: CBM 64, disk drive and joystick.

Type of game: Arcade.

Graphics: ****

Sound: *****

Playability: *****

Description: Aztec Warrior has to run and jump through seven levels avoiding traps and obstacles.

Price: On disk £12.95 and on cassette £8.95

CCI Rating: *****

BOOGA-BOO (The Flea)

"Booga-Boo we love you" is the title to the games introduction and it's true! This game just oozes with cuteness – with its little hopping flea and the strange world it inhabits.

The scene is set in a cavern containing weird, vegetation clad rocks. The graphics are bright and excitingly different – a demo at the beginning shows them off. The sprites are so exact that when Booga-boo falls over, his legs go all crooked looking very realistic.

The object of the game is to move the flea from the bottom of the cavern to the top. Using the joystick and the strength meter running along the bottom of the screen, the player manipulates the flea so that it hops from toadstool to ledge

up to the top avoiding the dragon and Venus flea trap. The screen scrolls left and right so that the best route to the top can be ascertained.

This game takes a bit of getting used to, but after a few tries, signs of improvement are obvious. The player only gets one life per game and every time the flea is eaten, the demo is shown. After the twentieth time it gets extremely tedious.

The graphics are vivid, the sounds very effective and the idea original, we loved the game and think most other people will too.

Title: Booga-Boo (the flea)

Programmer: Indescomp

Contact: Quicksilver Ltd, 13 Palmerstone Road, Southampton, SO1 1L1. Tel: 0703 20169.

Hardware: CBM 64, cassette recorder and joystick

Type of game: Arcade

Graphics: *****

Sound: ****

Playability: ****

Description: Manoeuvre Booga-boo from the bottom of the cavern to top avoiding the dragon and flea traps.

Price: £7.95

CCI Rating: *****

SLINKY

Slinky is a coiled metal spring and the player uses a joystick to move over the 54 cubes making up the playfield, changing the colour of each one as he steps onto them.

Friends of the wizard: Rusty rust cloud, Ralph raindrop, Marge magnet and Charlie the oilcan pass across the screen and can damage him. For example if the rust cloud pass over Slinky he turns brown.

The player gets five lives and 25,000 points to start with. These points can be gained or lost, for instance Slinky loses 100 points every time he moves, but if he becomes rusty the same move costs him 500 points.

There are 99 levels and a comprehensive manual explains the scoring system. The program makes good use of multi-coloured sprites and some of the demos are very amusing. Sound has also been utilised effectively and when Slinky completes one level, a musical fanfare announces the fact together with a waving flag. We don't know what happens when you complete the 99th level, but I don't think the game creators do either!

It is compulsive playing and there are a lot of little extras which give the game

its overall attraction.

Title: Slinky

Programmer: Paul Norman

Company: Audiogenic Ltd, PO Box 88, Reading, Berks. Tel: 290 6044 or 0734 586334.

Hardware: CBM 64 or SX-64, disk drive or cassette recorder and joystick.

Type of game: Arcade

Graphics: ****

Sound: ***

Playability: ****

Description: Slinky the spring has to change the colour of the playfield and evade nasty creatures.

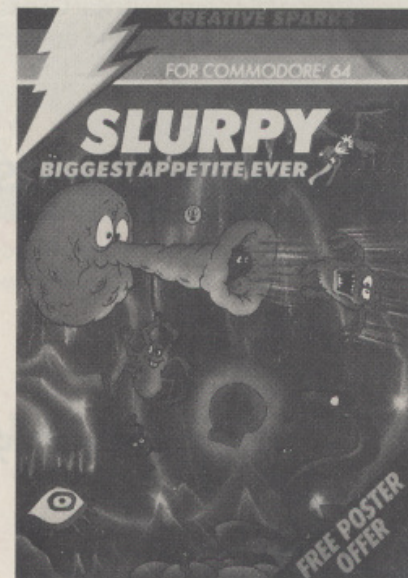
Price: On disk £12.95 and on cassette £8.95

CCI Rating: ****

SLURPY

Slurpy is a lovable little cave-dwelling creature, born with a large snout-like mouth and an insatiable appetite. He is constantly under attack from various enemies and your task is to help him out-manoeuvre them, using the joystick, and gobble them up. Once the little fiends are in line with the vortex in front of Slurpy's mouth they are automatically sucked in, but watch out if they turn red – that means they are poisonous and will kill Slurpy unless he spits them out quickly. Another danger to look out for is the earthquakes which happen if you take too long in slurping up all the glowbugs. These cause the cave roof to collapse onto Slurpy.

The graphics are simple, but effective and there's probably a lot more to them



than meets the eye. The sounds incorporated are also amusingly realistic — you can see (or hear) why they call him Slurpy!

Although it's a relatively simple game, for one or two players, Slurpy brings a definite smile to your face and is mildly addictive.

Title: Slurpy

Programmer:

Company: Creative Sparks, Thomson House, 296 Farnborough Road, Farnborough, Hants. Tel: 0252 543333

Hardware required: 64, cassette recorder, joystick

Type: Arcade

Graphics: ***

Sound: ****

Playability: ****

Description: Help Slurpy outmanoeuvre his enemies and eat them

Price: £7.95

CCI rating: ****

METAGALACTIC LLAMA BATTLE AT THE EDGE OF TIME

Based as the title suggests on the edge of time, an observation outpost is being attacked by Zzyaxian cyborg arachnid mutants. The only means of defence are metallamas endowed with a phenomenal spitting ability.

By using a joystick, the player controls the camels movements and can aim the spit at the spiders as they descend, from threads on a force field which crosses the screen and drop to the ground. On the ground they change into Weeviloids and destroy the camel on



contact.

Strategy must be used — by aiming the spit at the force field and moving it up and down it can be directed onto the weeviloids, spiders and web threads. Points are awarded for shooting the creatures and a quota meter tells the player how far away the wave is. There are up to 99 levels of difficulty and 3 camels per game. The player's score and the highest score are displayed on the screen.

Good use is made of colour, graphics and sound and the game will appeal to most arcade game enthusiasts.

Title: Metagalactic llamas battle at the edge of time

Programmer: Jeff Minter

Company: Llamasoft, 49 Mount Pleasant, Tadley, Hants. Tel: 07356 4478

Hardware: Unexpanded VIC 20, cassette recorder, joystick

Type of game: Arcade

Graphics: ****

Sound: ****

Playability: ****

Description: Metallamas shoot spit at invading spiders and weeviloids

Price: £5.50

CCI Rating: ****

COSMONAUT

A spaceship has crashed and the Cosmonaut must free it from the tractor beam by negotiating four successive levels, switching the beam off and returning to the ship.

Lifts take the cosmonaut down to each level, but patrolling stormtroopers fire arrows and must be avoided or killed. The game ends when the player loses all of his five lives or reaches the spaceship after completing his mission.

The colour scheme in the game is rather dull, but if the graphics were more brightly coloured it would be more appealing. The joystick control was not always as sensitive as it could have been and one annoying feature of the game is that if the cosmonaut is killed on the first level with a trooper nearby the next life is lost immediately as it just walks into him.

Points are awarded for events such as jumping on a stormtrooper or switching off a tractor beam and the players score is displayed alongside the highest score. The game is quite compelling and because there is a positive goal to be reached it would while away a few hours quite happily.

Title: Cosmonaut

Programmer: Clifford Ramshaw

Company: Melbourne House, Castle Yard House, Castle Yard, Richmond TW10 6TF. Tel: 01-940 6064.

Hardware: Unexpanded VIC 20, keyboard or joystick

Type of game: Arcade

Graphics: **

Sound: **

Playability: ***

Description: Negotiate four levels by killing or avoiding troopers and arrows to free the spaceship from a tractor beam.

Price: £5.95

CCI Rating: ***

DICKYS DIAMONDS

One of the most original games we have seen and the author is featured in this months Cult of the programmers.

In Dicks Diamonds a spider builds a web between two trees and attaches a jewel in the centre. An owl then appears and his aim is to go over every part of the web turning it black, end up above the diamond and catch it as it falls. Strategy is necessary because the spider also moves around the web turning it white again and will kill the owl if it catches up with him.

To vary the games levels there are a number of game options — nine speeds, seven types of starting web and a yes/no choice of whether to have an unlimited number of flights for the owl and a second spider. If the player chooses to have a limited number of flights the owl can only pass over part of the web he has already been over thirteen times.

The screen displays the jewel score, number of flights left, the current score and the highest score. The graphics are often complemented by sound, for instance when the owl flies he beats his wings and there is a flapping sound. Dicks Diamonds would make a good addition to a games collection because it is so different.

Title: Dicks Diamonds

Programmer: Brian O'Shaughnessy

Company: Romik Software Ltd, 272 Argyll Avenue, Slough, Berks. Tel: 75 71535.

Hardware: CBM 64, cassette recorder, joystick

Type of game: Arcade

Graphics: ***

Sound: ****

Playability: ****

Description: Guide the owl round the spiders web and collect the diamonds.

Price: £6.99

CCI Rating: ****

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7: LORDS OF TIME. Our congratulations to Sue Gazzard for her super design of this new time travel adventure through the ages of world history. Chill to the ice-age, go romin' with Caesars legions, shed light on the Dark Ages. etc. etc.

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REVIEWS

"Adventures which have a fast response time, are spectacular in the amount of detail and number of locations, and are available to cassette owners... Simply smashing!"

- Soft, Sept 83

"Colossal Adventure is included in Practical Computing's top ten games choice for 1983: 'Poetic and tough as hell.'"

- PC, Dec 83

"To sum up, Adventure Quest is a wonderful program, fast, exciting and challenging. If you like adventures then this one is for you!"

- NILUG issue 1.3

"Dungeon Adventure is recommended. With more than 200 locations, 700 messages and 100 objects it will tease and delight!"

- Educational Computing, Nov 83

"Snowball... As in all Level 9's adventures, the real pleasure comes not from scoring points but in exploring the world in which the game is set and learning about its denizens... this program goes to prove that the mental pictures conjured up by a good textual adventure can be far more vivid than the graphics available on home computers."

- Which Micro?, Feb 84

"Lords of Time. This program, written by newcomer Sue Gazzard, joins my favourite series and is an extremely good addition to Level 9's consistently good catalogue... As we have come to expect from Level 9, the program is executed with wonderful style - none of those boring 'You can't do that' messages! Highly recommended."

- PCW, 1st Feb 84

Adman

ELECTRONICS

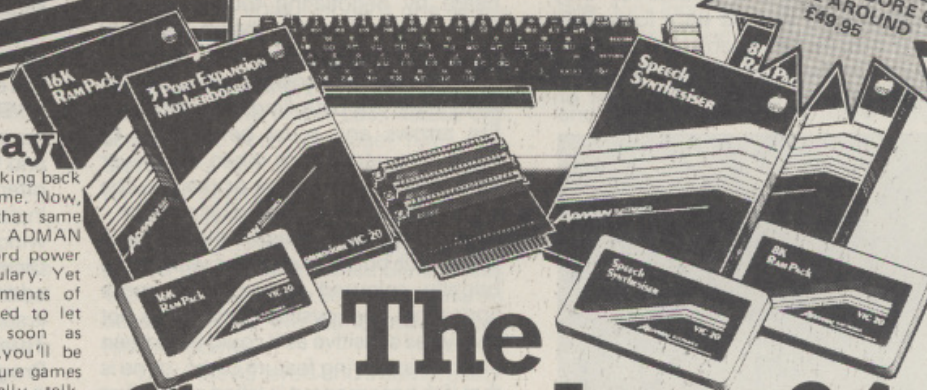
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THE WIZARD AND THE PRINCESS

A cross between an adventure and an arcade game, the story is that the wicked wizard has the princess captive in his castle. The game is divided into five parts and the player – the would be rescuer, must use arcade skills to negotiate each level and take the fair damsel away.

The keyboard is used for controlling the knight and in the first part he must find the castle. On completion of each level, pressing shift run/stop loads the next part and if one level proves too much for anyone it is possible to go straight onto the next one. At the end, the only way to get back to the beginning is to reload the whole game.

Once in the castle, a dragon has to be killed, a way through the labyrinth found and monsters slain. In the final part of the adventure, the player must do battle with a troll on a bridge while holding the princess.

The controls are sometimes annoyingly slow, but the idea of having a multi-part adventure game is a good one and this game will probably appeal to the younger generation.

Name: The Wizard and the Princess
Programmer: Clifford Ramshaw
Company: Melbourne House, Castle Yard House, Castle Yard, Richmond TW10 6TF. Tel: 940 6064.
Hardware: Unexpanded VIC 20, joystick, cassette recorder
Type of game: Arcade/adventure
Graphics: ****
Playability: ****
Description: Rescue the princess from the castle by negotiating five different game situations.
Price: £5.95
CCI Rating: ****

NEOCLYPS

The planet Neoclyps has been invaded by baddies. Radar towers have been set up and the aliens fly around in the sky terrorising the populace.

The player guides a spaceship with the joystick and must zap both aliens and the towers. The joystick control could be more sensitive. There are four levels to choose from and each game has a supply of 12 spaceships. The best way to destroy a radar is to shoot an alien first as this gives the ship a striped shield and enables the ship to pass through buildings for four seconds.

The graphics are good, but rather dull – the landscape would be more interesting if it was brightly coloured. The radar smokes when it has exploded

– a nice touch. There are four quarks and the status board at the end of each game indicates the score, the region the player was in and the number of radars and aliens left. If you manage to clear the planet the player returns to even more aliens and towers.

Neoclyps is the sort of game that would fill a few spare hours very nicely.

Title: Neoclyps
Company: Personal Software Services, 452 Stoney Stanton Road, Coventry.
Tel: 0203 667556
Hardware: CBM 64, cassette recorder, joystick
Type of game: Arcade
Graphics: ***
Sound: **
Playability: ***
Description: Destroy the alien spaceships and towers on the planet Neoclyps.
Price: £7.95
CCI Rating: ***

FORBIDDEN FOREST

The hunter armed with a bow and arrow is in the forest and must defend himself against a series of attacks. Spiders, bumble bees, frogs, dragons, skeletons and finally the demogorgon assail him. The fire button on the joystick controls the arrows, but it takes such a long time for the arrows to reload, that the hunter spends most of the time running away.

There are four levels ranging from innocent to crazy and the complicated scoring system is explained in the manual. The graphics are three-dimensional and quite effective, but occasionally ragged round the edges. There are four forest areas for the hunter to move into and the moon passing across the sky, representing time is a nice effect.

There are some useful controls, for instance the player can start the game from where he left off rather than going to the beginning again. Quite a good game for those who enjoy fighting off different types of attack to reach a goal.

Title: Forbidden Forest
Programmer: Paul Norman
Contact: Audiogenic Ltd, PO Box 88, Reading, Berks. Tel: 01-290 6044 or 0734 586334
Hardware: CBM 64, disk drive and joystick
Type of game: Arcade
Graphics: ***
Sound: ***
Playability: ****
Description: Hunter fights off the

forest creatures by shooting them with his bow and arrow.

Price: On disk £12.95 and on cassette £8.95.

CCI Rating: ***

MULTITRON

Multitron is an exciting game which inspires compulsive playing. The player is in command of a starfighter ship and must defend it from successive waves of space creatures by controlling the joystick or keyboard.

There are several levels, each one having to be completed before the player can move onto the next. There are seven types of creatures and each one has a slightly different way of approaching the attack, but they all drop bombs. The Meanies are the first assailants and worth ten points each, whereas the more aggressive Cosmic Phoenix is worth 75 points. An energy indicator on the screen shows the player how much power there is left in the laser cannon.

The final task in any level is steering the ship through a space corridor and if that is successful a bonus life is awarded. There are four to start with. There is no goal except to get onto the next level successfully. Good use is made of the graphics and the sound suits the game. A good game for the VIC if you like attack and evade tactics.

Title: Multitron
Programmer: T. Flanders
Contact: Sumlock Microware, Royal London House, 198 Deansgate, Manchester M3 3NE. Tel: 061-834 4233.
Hardware: Unexpanded VIC 20, cassette recorder, keyboard or joystick
Type of game: Arcade
Graphics: ***
Sound: **
Playability: ****
Description: Defend a starship from seven types of space creature and steer a way through the space corridor.
Price: £7.95
CCI Rating: ****

All games reviews appearing in this magazine are personal opinions and serve only as a guide to new games on the market. Our star ratings for graphics, sound, playability and the CCI rating are as follows:

* = Poor
 ** = Average
 *** = Good
 **** = Very good
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Games graphics

A preview of Romik's Graphics Editor and a look at Adman's speech synthesiser for the 64

All good games need graphics and in the early days a prospective programmer would have had to spend hours with graph paper and a calculator to get a picture. To make life easier, Romik are bringing out the Graphics Editor which is due for release in the next couple of months. The program is divided into three parts – the character editor, the sprite editor and the screen editor. Although each one is a separate program, they can be combined. For example a picture can be created by using the screen editor with programmable characters from the character editor.

The manual is detailed and explains in a clear and precise style exactly what command facilities there are in each system. All the commands are single characters except for the screen editor, so that the controls are kept to a minimum. In each section, the letter controls are clearly listed alongside the appropriate function in the program. The program had been kept as simple as possible and is extremely user friendly – anyone familiar with the 64 would have very little trouble with it.

One of the advantages of having everything done for you by Romik's graphics editor is that the time saved can be used for other things – experimenting with different characters and sprites for example. Display screens in each section are used for the creation of pictures. The graphics can be moved around, inverted, scrolled, their size altered and the border and background

colours changed.

There are two screens in the character editor, one changes the characters and the other is a block display of all the characters edited in the other screen. Similarly the sprite editor has a blank screen on which to build the sprites and the side several different dimensional views show what they look like from all angles. The screen editor is used with the character editor and enables the user to experiment with a whole screenful of characters.

All three sections present a complete list of commands necessary to create some good professional looking pictures. These can be used in games and other programs. We found this program effective and simple to use. It will be invaluable to a 64 programmer.

Product:

Graphics Editor

Company:

Romik, 272 Argyll Avenue, Slough, Berks. Tel: 75 71535

Features:

Character Editor
Sprite Editor
Screen Editor

Applications:

Designing graphics for use in programs

Documentation:

Clear and detailed manual

Hardware:

CBM 64, monitor or television and cassette recorder

Price:

To be confirmed

Adman's speech synthesiser is one of the first to be released with the backing of several software companies and Voyager, Crystal and Bug-byte have already released compatible software. The package contains a motherboard which slots into the cartridge port and a cartridge which fits onto the back of that.

Attached to the cartridge is a lead which fits into the video port. It is built round a SP0256-AL2 speech processor chip which is preprogrammed to understand 64 allophones. (See our review of the VIC 20 version in March '84 issue for further information).

Product: Speech Synthesiser

Company:

Adman Electronics, Ripon Way, Ripon Road, Harrogate, North Yorkshire HG1 2AU. Tel: 0423 62642

Features:

Utilises Allophones in voice construction

Applications:

Used in educational programs

Adds speech to a number of games

Documentation:

Adequate manual with coded allophone tables

Hardware:

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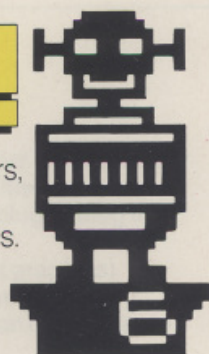
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The cult continues

A further look at the people behind the games

Trevor Hall – Bug-Byte

Programmer Trevor Hall compares the computer game market with the music industry. He says: "The games market is tending towards the pop industry. There's a market for good rock records and also one for kids rubbish. Kids are getting more discerning in their choice of games, but they are still accepting rubbish."

Trevor, now 24, is the author of Bug-Byte's *Twin Kingdom Valley*, a new version of which has just been released to tie in with the new Adman speech synthesizer for the 64. All words which appear on the screen during the game are now voiced.

Two years passed from the original conception of *Twin Kingdom* to its completion.

"It was written in stages like a book," says Trevor. "I tend to shelve one thing

and get on with writing something else. Usually I'm working on about two games at a time, and a game can take between six weeks to six months to write." Trevor then allows about two months for testing his games, usually letting his friends loose on them and improving them wherever possible.

Ideas come from experience and from keeping an eye on other games on the market. "I see what other people have done and then set out to do it ten times better and ten times faster," says Trevor. His experience in the world of computers began about five years ago with a degree in computer science. Trevor explains: "I got into computers because I was good at maths. At the time the only computer you could get was a PET. I became interested in micros because I could see a market there."

From there Trevor approached Bug-Byte who accepted and published his

material.

Programming is now a full time job for Trevor, but he now sticks to 'normal' working hours. "A few years ago I was working until two in the morning, but there's no point in killing yourself," he says.

Trevor is looking towards more realism in computer games and is keen on the idea of more 3D games. "We need to get past the stage of these half-baked flying saucers," he comments.

At present Trevor is putting the finishing touches to his next release. It is to be a trading game with the player as the last trader in a planetary system, each planet having its own economy. It's a mixture of adventure and arcade action, but space warfare can be avoided by those who don't enjoy 'zap, pow' games by bribing the marauding pirates.

Philip Mitchell is the man responsible for Melbourne House's *The Hobbit*, probably one of the most sophisticated adventure games on the market. Philip and some friends from Melbourne University originally got together with the intention of producing a better adventure system. The *Hobbit* story line came later.

Philip recalls: "The initial design of the system took six to eight months and then another ten months was spent in writing the story line. It took a long time to get the story working on the computer as there were a few things we weren't sure about. We had days when we did little but talk about ideas which wasted some time."

At 23, Philip has been programming for nine years, going back to his school days. His initial experience with computers came from building his own micros as a hobby, despite the fact that he has had no technical education. Studying for a degree in computer science, programming became a natural extension of Philip's interest in the world of computers.

"It's been my experience that people who have a background of work on the machines are more at home programming in Assembly language," says Philip. "It gives you a feeling of what is going on inside the computer."

When faced with deadlines, it is not unusual for Philip to be working 14 or 15 hours a day, six days a week, but as a rule he prefers to work an average of 35 to 40

hours a week. "I find that if I'm tired I don't work too well," says Philip. "At times it is better to take the whole day off."

Philip's next big project is the follow up to *The Hobbit*, another adventure story, but "bigger and better". This time the story is to be based on the Sherlock Holmes characters. Philip explains: "It's not based on any particular Holmes story, but the characters within the stories. The player is Holmes and the game has got all the atmosphere of Conan Doyle's books."

Philip predicts that in the next few years the personal computer as we now know it will become extremely powerful and cheap enough for everyone to afford, offering potential for some really sophisticated games. "There are so many things I want to do in the games area that my time is booked up for the next ten years," says Philip, at the same time admitting that the computer market changes very quickly. He adds: "I take things as they come. In this industry ten years is a long time – it's impossible to predict the next six months."



Philip Mitchell –
Melbourne House

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Brian O'Shaughnessy – Romik

After studying electronics, unemployment forced 26-year-old Brian O'Shaughnessy to move down to London in search of work. He became an engineer and learnt about micros inside and out, repairing them during working hours and playing with them at lunchtimes and after work. Brian began programming his own material in the evenings, first on the almost forgotten UK101 computer, followed by a PET, the VIC and then the 64. "In fact as a new computer appears I have to buy it," jokes Brian.

Romik's Dicky's Diamonds was written by Brian and therein lies a tale. Dicky, the little owl character, was not originally intended to be an owl. Brian explains:

"My original idea was to have a dragonfly in the game but the wings are too long! Once I had decided on the owl, I spent hours looking through animal encyclopaedias in search of the perfect shape."

Dicky is now Brian's trade mark and will probably appear somewhere in all his future games. Dicky even makes a brief appearance in Brian's Graphics Editor, designed to enable people to create their own graphics and save them for use in their own games. (The Graphics Editor will shortly be released by Romik and is reviewed elsewhere in this issue.)

Brian has set himself a target of writing six games a year. He feels his background knowledge of computers is

invaluable in programming.

"I've never been on any programming courses, but I do know how a computer works. When working on a game, I decide what I want to do and then use the computer to its full capabilities," says Brian. He writes each section of the program separately and tests each part as he goes along. "A lot of people write games in a hurry," comments Brian. "It takes five times as long to sort it out and you have a program full of bugs that is no good to anybody. It's best to work out everything in your head before typing anything into the computer."

For many programmers, the excitement of playing computer games is lost once they know how they work. The same is true for Brian. "I play my games so much in testing them that by the time I'm half way through I'm sick of the sight of it. Three-quarters of the way through I start thinking about what I want to work on next."

Programming takes up a fair amount of Brian's time. For six days a week he works from 9am–6.30pm and then from 8–11pm on three evenings. But Wednesdays are a day off and computers are then a forbidden subject. In addition to all this programming, Brian is still finding the time to build his own disk drive. It is far too expensive to consider marketing, but it is a great programming aid to Brian allowing him to assemble programs at a far greater speed.



Dean Lock – Creative Sparks

Dean Lock had never seen a micro before his temporary employment with Thorn EMI as a student preparing the story boards for games. "At college we had a main frame computer with punch cards," says Dean. "That's what I thought all computers were like."

Now Dean is in charge of all 64 games for Thorn EMI's new computer games label, Creative Sparks. After initially playing computer/video games

in his lunch hour and after work, Dean now gets sick of the sight of his games by the time they are finished.

Thorn EMI give their programmers six to eight months for each game, which sounds quite a long time when you're working full time on it. Dean explains that the first three to four months are taken up with the nuts and bolts of programming the game and the rest of the time is taken in tuning the game to meet everybody's tastes – "you have to ferment a game like wine", says Dean. "A good game should be like a record. You can happily play it 30 times when you first buy it and then play it again at a later date."

The idea for Dean's latest game to be released on the Creative Sparks label, Black Hawk, germinated in the midst of the Falklands.

Dean's method of writing games sounds a bit long-winded – he uses three different machines – but it works for him. "I start off using the Atari for its editor/assembler," says Dean. "Then I download onto the VIC which I use as an RS232, and then from the VIC to the 64

for its excellent graphics."

Many programmers seem to spend their entire existence at the keyboards of their computers – not Dean. "Two years ago I was trying to prove myself as a programmer working for 12 hours a day," he says. "At 25 I'm a bit too long in the tooth for that. I've got to stay sane, so now I work as many hours as anyone else – about 37 hours a week."

Games are now played during work hours only.

Although, like most programmers, Dean does not claim to have made his fortune just yet he does receive a basic salary in addition to various bonuses – bonuses for the number of months in service in the company and bonuses for the number of his games sold. So it isn't an unlikely occurrence to receive a £7000 bonus for the month. I wouldn't complain!

Looking to the future Dean says: "I'd like to become involved with video disc games. You can use real life footage with superimposed computer animation. That could lead to some really interesting adventure games."

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Hobbit revealed

Bilbo Baggins is really up against it. After three months he's conquered 40 per cent of the game on his 64, then some guy by the name of Elkan (a Tolkien invention, if ever there was one – and there were, as we all know, a few!) comes up with a book that spoils all the fun.

At least that's what it looks like at first. A Guide to Playing The Hobbit. What could be better designed for spoiling the fun? Every time you get stuck you can turn to the book. Even worse, it might be possible to play your way all through the game with this book.

Fortunately Bilbo has nothing to worry about. The book isn't quite like that. For one thing you have to be pretty familiar with the game to understand the book. It doesn't give away everything – at least not all at once. David Elkan has given clues and hints here and there without spelling everything out. But if you're one of those who can't resist looking at the answers to the crossword before you've worked them out for yourself he's provided an obstacle.

In The Hobbit Help section of the book David Elkan has expanded on the Help given in the game. In case you're tempted to look too far ahead he's used a code that's very simple but which involves just enough work to stop you from going too far too soon.

The Hobbit Help section is the middle chapter of the book. The first is an

introduction to the game, more or less an expansion of the mini-manual that comes with the game. The third and final chapter is A Tourist's Guide to Wilderland. It's a guide to most of the game's locations and solutions to the problems encountered in each location. This is the part of the book that might have really bugged Bilbo. It gives you the answers and could make the thing too easy.

Luckily for Bilbo the game comes to it's own rescue. Part of the magic of The Hobbit is its unpredictability. Eventually, of course, you'll get the whole thing sussed out. After all, it is finite! But there are enough alternatives and enough changes from game to game to make it fun even with a book like A Guide to Playing The Hobbit.

Since Melbourne House publish the book and also publish the game you can rest assured that it doesn't spoil the game. Otherwise their sales of both the book and game would dwindle. But wait! Perhaps there those who know not The Hobbit – neither the original book by JRR Tolkien or the computer game.

Tolkien was a master of his art and The Hobbit is an excellent tale. It serves as a wonderful introduction to The Lord of the Rings – a trilogy that some thought was one of the best pieces of fiction written in English.

It's one of those classic tales of good versus evil, a fantasy in which strange creatures such as dwarves and elves inhabit Middle Earth.

It's a marvellous book and The Hobbit is a superb game. Probably the best adventure game in the UK. How you feel about A Guide to Playing The Hobbit depends very much on how you feel about the game. If you have enjoyed the game and feel you have got everything out of it that there is to get out of it then you'll probably find the book very interesting. A couple of Hobbit addicts in the office who have been playing the game on and off for a couple of months were astounded to find screens they'd never seen. If you've become completely frustrated by the game and can't get out of the Elvenkings' dungeons then this book will be just like a golden key –

One final word about the price of this paperback (£3.95). OUCH!

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We're giving away a copy of The Hobbit to the first 50 correct entries to a simple competition. You won't need to have played the game before but some familiarity with the book might do you some good.

Failing that, use the review on this page as a reference. In the wordsquare below there are 10 words relating to The Hobbit. They all appear in the review on this page. All you have to do is to send us a list of the ten words on the form on this page. Please remember to fill in your name and address. And remember, the words relate to The Hobbit and appear in the review. It's also worth remembering that you can only play The Hobbit on the 64.

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What's in a name?

In the first issue of *Commodore Games* we define the many and varied games categories

Amusement arcades have been with us for many years now, their contents changing from the one-armed bandits and mechanical 'shove-halfpenny' games to the more recent Space Invaders and suchlike. The cost of playing these games has also changed dramatically from the old one-penny to the new 20 pence, but that has never affected their popularity.

Just a few years ago, people had the opportunity to play electronic games in the comfort of their own home with the appearance of TV games – a relatively cheap little 'box' which was attached to the television. Many were content to while away the hours knocking a small square from one end of the screen to the other with a rectangular shape – this was TV tennis.

Technology moves fast and now, with the emergence of sophisticated computer games, it is hard to believe that anyone could have found enjoyment in those slow repetitive games.

The earliest computer games available were computer versions of the popular arcade games – the obligatory Space Invaders and Pac-Man. Now games players are spoilt for choice with a growing list of games falling into numerous categories: arcade, adventure, arcade/adventure, simulation, sport, action/strategy, educational and even semi-educational!

The list is steadily expanding as software houses come up with ideas for original categories to boost sales of their games. How do you define which category a game belongs to? Is there any real difference between simulation and sport, or arcade and action/strategy? In this first issue of *Commodore Games* we will try to define these categories.

Arcade

Arcade games have been around for the longest period of time and still account for the largest share of the software market. Most people define arcade games as a 'zap! pow!' game, something like Space Invaders – basically to shoot anything on the screen before it kills you. However the arcade category is rather more general than that, covering any game where the player has to move

an object around the screen, such as in maze games like Pac-Man.

Arcade games test your reflexes.

Action/strategy

A new breed of game is apparently emerging under the category action/strategy. However we can see no difference between this new category and arcade games. Being marketed under this category is Creative Sparks' Black Hawk, in which your task is to guide your fighter-plane across enemy territory to liberate a small group of islands.

Adventure

Adventure games vary from the simple adventure to a really sophisticated game. This category can be further divided into three smaller categories: text adventures, graphics adventures, and a cross between the two.

Text adventures, as the name implies, consist purely of screen text as in Romik's Sword of Hrakel adventure. The computer describes your surroundings and asks you what you want to do. Whether you want to move north, east or west, or even up and down. Also what to do when confronted with an object, be it a golden key or a rabid wolf.

Graphics adventures are those where you are dependent on the graphics to play the game. For example Krystals of Zong from PSS, where you have to guide your man around the maze picking up the keys that will enable him to get to the treasure. However some may define this game as an arcade adventure! Confused? Read on.

Then, of course, there are adventure games which combine both text and graphics. Melbourne House's The Hobbit is a good example of this, illustrating your every move.

On the whole, adventure games are designed to test your powers of logic rather than your reflexes.

Arcade/adventures

This category includes those games which combine adventure with an

element of arcade action. These require both logic and good reflexes.

Unfortunately if you are not very good at adventures you may never reach the arcade stage. Likewise, if adventures are your speciality, you may be killed before you can continue your adventure.

Bug-Byte will soon be launching a trading game where you are the last trader in a planetary system. Arcade action comes in the form of marauding pirates, but this can be avoided by bribery!

Sports

It is sometimes hard to differentiate between the sports and the simulation category. Falling into the sports category are games such as the computerised table football game from Bubble Bus. Using the joystick and fire button you determine which handle you wish to move and in which direction. A more sophisticated football game comes from Commodore themselves, with the player controlling an eleven-strong team complete with cheering crowds and even the presentation of a cup.

Football is just one of the sports with a computerised equivalent.

Simulation

The only difference between this category and sports programs is that in a simulation program you take on a role. The best example is probably found in flight simulation programs where you become a pilot taking off and landing your plane.

Anger Productions have released what they are terming business simulation programs. In their flight simulator you are required not only to pilot the plane, but also to plan a route taking into account factors such as fuel. A simulation/adventure?!

Education

Educational programs are fairly self-explanatory, basically they teach you how to do something. Usually aimed at the very young, there are numerous educational programs on the market which teach the player how to read, write, spell and count, combining learning with a games element.

What's in a game?

In this section, we are going to take a look at how a game is made up. To demonstrate this we have a game called **MOONLANDER** for the VIC-20 (any expansion). We will look at this program very carefully and explain what the separate routines do.

Description

The first thing to look at is what the game is supposed to do. In this example, it is a simple simulation game where you control the thrust from your ship's engines in an effort to make a successful landing. The thrust values are from 0 (no thrust) to 9 (maximum thrust) where a value of 5 will keep constant speed.

You must land with a speed of 15 or less km/h (units).

Display

The display must then be worked out.

In Moonlander, the ship is displayed in the middle of the screen and on the left is a box containing all of the values (parameters) required to land.

The parameters are for fuel left, height from ground, speed, and time.

The Program

Now for a routine by routine explanation of the game. A less detailed description appears in the REMs that do not need to be typed in.

10 REM MOONLANDER	
20 REM *****	
30 REM	
39 REM	
40 REM RED SCREEN AND INSTRUCTIONS	
41 REM	
50 POKE36879,42:GOSUB1090	50 Set the screen colour and gosub to display instructions.
59 REM	
60 REM WHITE SCREEN FOR GAME	
61 REM	
70 POKE36879,25:POKE36869,240	70 -180 Produce display and set up initial parameters.
80 PRINT"J";	
90 I4=15	
100 GOSUB730	
110 PRINT"Q"	
119 REM	
120 REM SET UP PARAMETERS	
121 REM	
130 TH=0:T=0	
140 X0=52800	
150 V0=-176:F=1:S=1	
160 GOSUB450	
170 GOSUB1010	
180 AT=TI:AC=TI	
189 REM	
190 REM INPUT FUEL USAGE	
191 REM	
200 GETRR\$:IFRR\$<>" "THENP=VAL(RR\$)	200 -220 Main loop for input and also a time lag.
210 IF(TI-AT)>30THENAT=TI:GOTO240	
220 GOTO210	

Programming

```

229 REM
230 REM CALCULATE NEW VALUES
231 REM
240 T=T+R
250 TH=TH+1
260 A=5.4*(1-0.2*R)
270 X=V0+0.5*A:X0=X0+X
280 IF X0>0 THEN 300
290 X=X-X0:F=0:X0=0
300 D=V0*V0-2*X*A
310 IF D>0 THEN 330
320 D=-D:S=-1
330 V0=SQR(D)*S*SGN(X)
340 S=1
350 IF V0>0 THEN PRINT "B";
359 REM
360 REM DISPLAY LANDING PARAMETERS
361 REM
370 PRINT "SPEED: "; MID$(STR$(V0), 2, 5) " MPH";
380 PRINT LEFT$(STR$(X0)+A$(0), 7);
390 PRINT "X0: ";
400 PRINT "T: "; 2500-T " "; TAB(8); TH
410 GOSUB 660: IFF=0 THEN GOSUB 790: GOTO 880
420 IF T>2500 THEN R=0: GOTO 250
430 GOTO 200
439 REM
440 REM INITIALISE STRINGS FOR SHIP
441 REM
450 A$(0)="XXXXXXXXXX"
460 A$(1)=" "
470 A$(2)=" "
480 A$(3)=" "
490 A$(4)=" "
500 A$(5)=" "
510 A$(6)=" "
520 A$(7)=A$(6)
530 PRINT " "; TAB(15);
540 FOR I=0 TO 6
550 PRINT A$(I)+A$;
560 NEXT
569 REM
570 REM PRINT DISPLAY AROUND PARAMETERS
571 REM
580 PRINT " ";
590 PRINT " SPEED HEIGHT "; GOSUB 620
600 PRINT " FUEL TIME "; GOSUB 620
610 RETURN
620 FOR I=1 TO 2: PRINT " "; TAB(13); " "; NEXT
630 PRINT " "; RETURN
640 REM IF KEY GREATER THAN 0 PRESSED,
650 REM DISPLAY 'BURN'
660 PRINT TAB(15);: IFR=0 THEN POKE 36878, 0: RETURN
670 POKE 36877, 150: POKE 36874, 200: POKE 36878, R
680 FOR I=1 TO R: PRINT " "; NEXT
690 FOR I=RT010: PRINT " "; NEXT
700 PRINT "TTTTTTTTTT";: FOR I=1 TO 10
710 PRINT " "; NEXT: RETURN
719 REM
720 REM PRINT 14 RANDOM / ON SCREEN
721 REM
730 PRINT " ";

```

240 -350 Calculate new parameters for landing.

370 -430 Rest of main program loop. Display Landing parameters and thrust if needed.

450 -560 Initialise strings used to display ship and display it.

580 -630 Display box around area for landing parameters.

660 -710 Display thrust from bottom of ship.

730 -770 Display random stars.

Programming

```

740 FORI1=1TO14
750 PRINTTAB(20*RND(1));". "
760 NEXTI1
770 RETURN
779 REM
780 REM DISPLAY SURFACE
781 REM
790 H=4.5:H$(1)="_":H$(2)="_":H$(3)="_"
800 H$(4)="_":H$(5)="_":H$(6)="_"
810 H$(7)="_":H$(8)="_"
820 PRINT"XXXXXXXXXXXXXXXXXXXX"FORI=1TO21
830 N=INT(RND(1)*7)+1:IFABS(N-H))2THEN830
840 POKE36877,0:POKE36874,0:POKE36878,0
850 H=N:PRINTH$(N):NEXTI:RETURN
859 REM
860 REM SHIP HAS LANDED OR CRASHED
870 REM DISPLAY SHIP AS NORMAL
871 REM
880 PRINT"XXXXXXXXXSPC(15);
890 FORI=1TO10:FORJ=8TO5:PRINT$(J)+H$;
900 NEXT:PRINT"TTTTT":NEXT
910 IFH<15THEN940
920 PRINT:PRINT"XXXXXXXXXGOOD LANDING.":GOTO970
929 REM
930 REM DISPLAY CRASHED SHIP
931 REM
940 PRINT"XXXXXXXXXXXXXXXXXXXXXXXXX"
950 PRINT"XXXXXXXXXXXXXXXXXXXXXXXXX"
960 PRINT"XXXXXXXX"
970 INPUT"ANOTHER GO ":G$
980 IFLEFT$(G$,1)="Y"THEN90
990 END
999 REM
1000 REM COUNTDOWN TO START
1001 REM
1010 PRINT"XXXXXXXXXXXXXXXXXXXXXXXXX"
1020 A=TI
1030 PRINT"START OVER"5-INT((TI-A)/60);
1040 PRINT"SEC."
1050 IF(TI-A)<300THEN1030
1060 PRINT"R=0
1070 RETURN
1079 REM
1080 REM INSTRUCTIONS
1081 REM
1090 POKE36869,242:REM IN LOWER CASE
1100 PRINT"***** MOONLANDER *****"
1110 PRINT"YOU MUST LAND YOUR"
1120 PRINT"SPACE SHIP ON THE MOON."
1130 PRINT"YOU HAVE CONTROL OVER THE ";
1140 PRINT"SHIP BY CHANGING THE FUEL USAGE."
1150 PRINT"YOU CHANGE THE FUEL USAGE ";
1160 PRINT"WITH THE KEYS 0..9 - F KEEPS"
1170 PRINT"CONSTANT SPEED."
1180 PRINT"YOU MUST LAND WITH A SPEED ";
1190 PRINT"OF LESS THAN 15 M/H."
1200 PRINT"GOOD LUCK."
1210 PRINT"START WITH A SPACE."
1220 GETA$:IFA$=""THEN1230
1230 RETURN

```

READY.

790 -850 When height ≤ 0 , display surface of moon.

880 -920 Display ship landing.

940 -960 Bad landing (too fast) display crashed ship.

970 -990 Start a new game or end.

1010 -1070 Countdown to start.

1090 -1230 Display instructions.

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Games for the 64

This month we have two programs for the 64. The first is a short game called Q*BERT written by N Cooper. The other game is a maze game which creates a random maze and then allows you to move through the maze using the keys 'F' for forward, 'R' to turn right, 'L' to turn left.

Q*BERT

Written by N Cooper, this game is a 64 version of the arcade game of the same name. The movement is obtained by the keys:

'T' up & left

'V' down & left

'U' up & right

'N' down & right

Or by the joystick in port 2 using the diagonals.

The object of the game is to jump

onto the non-coloured squares. When all the squares have been coloured, the pyramid will be re-drawn and your task will re-start.

Beware of the white ball which will cause loss of a life if it hits you, and don't jump off the edge of the pyramid unless onto one of the floating disks which will lift you up and drop you safely onto the top square.

Start the game by pressing any key.

```
10 REM ***** Q*BERT BY N.R.C. *****
20 DIM P(72):HI=0:C=1
30 SC=0:LI=5:POKE53280,6:POKE53281,14
40 PRINT "##### Q*BERT!!":PRINT "####"
50 PRINT "##### BY N.COOPER":WAIT198,1:PRINT "[]"
60 V=53248:RESTORE:T=0:POKEV+21,15
70 FORI=1TO72:READP(I):NEXT
80 DATA2,2,2,2,2,2,2,2,2,2,0,2,2,2,2,2,2,2,2
90 DATA0,0,2,2,2,2,2,3,0,0,0,0,3,2,2,2,2,0,0,0
100 DATA0,2,2,2,0,0,0,0,0,2,2,2,0,0,0,0,0,0,2,0,0,0,0,0,0,2,2,2,2,2,2,2,2,2
110 PRINT "#####";
120 PRINT "#####";
130 PRINT "#####";
140 PRINT "#####";
150 PRINT "#####";
160 PRINT "#####";
170 READA:IFA=-1THENGOTO280
180 POKE832+Z,A:Z=Z+1:GOTO170
190 DATA0,0,0,0,0,0,0,0,0,0,0,0,62,0,0,255,128,1,255,192,1,156,192,3,222,224
200 DATA3,255,224,3,222,224,3,189,224,1,251,192,0,239,192,1,223,128
210 DATA1,247,0,0,102,0,0,102,0,0,68,0,1,206,0,1,206,0,32,0,0,0
220 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,127,128,1,140,96,6,12,24
230 DATA4,12,8,15,255,252,15,255,252,12,12,12,14,12,28,9,140,100,4,127,136
240 DATA3,0,48,0,255,192,0,0,0,0,0,0,32,0,0,0
250 DATA0,0,0,0,0,0,0,0,0,255,0,3,129,192,3,60,192,15,255,240,15,255,240
260 DATA15,255,240,15,255,240,15,255,240,15,255,240,3,255,192,3,255,192
270 DATA0,255,0,0,0,0,0,0,0,0,0,0,0,0,31,0,0,0,0,0,32,32,-1
280 POKE2040,13:POKEV+39,9
```



```

290 POKE2041,14:POKEV+40,3:POKE2042,14:POKEV+41,3
300 POKE2043,15:POKEV+42,15
310 X=164:Y=140:X1=0:Y1=0:A=44:UL=0:UR=0:DL=0:DR=0:BX=164:BY=86
320 POKEV+2,127:POKEV+3,115:POKEV+4,200:POKEV+5,115
330 X=X+X1:Y=Y+Y1:POKEV,X:POKEV+1,Y:X1=0:Y1=0:PRINT"SCORE"SC"      HI"HI
340 ONP(A)+1GOSUB530,460,600,640
350 H=PEEK(V+30):POKEV+6,BX:POKEV+7,BY:BX=BX+9*SGN(RND(1)-.5):BY=BY+15
360 IFBY>194THENBX=164:BY=86:POKEV+6,BX:POKEV+7,BY
370 IFH=9THENGOSUB600
380 GOSUB750:IFK=64THENFORI=0TO200:NEXT:GOTO350
390 X1=8*(K=22OR=31)-8*(K=30OR=39):Y1=16*(K=22OR=30)-16*(K=31OR=39)
400 GOSUB410:GOTO330
410 S=(INT(A/8))/2:IFS=INT(S)THENUL=-9:UR=-8:DL=7:DR=8:GOTO430
420 UL=-8:UR=-7:DL=8:DR=9
430 J=(K=30)+2*(K=39)+3*(K=31)+4*(K=22):J=ABS(J)
440 ONJGOTO450,470,490,510
450 A=A+UR:SC=SC+100
460 RETURN
470 A=A+DR:SC=SC+100
480 RETURN
490 A=A+DL:SC=SC+100
500 RETURN
510 A=A+UL:SC=SC+100
520 RETURN
530 N=INT(X/8)+40*INT(Y/8):POKE55134+N,C
540 POKE55135+N,C:POKE55174+N,C:POKE55175+N,C
550 P(A)=1:T=T+1:SC=SC+100
560 IFT=28THENFORI=0TO16STEP.1:POKE53280,I:NEXT:POKE53280,6:GOTO580
570 RETURN
580 POKEV+21,0:SC=SC+1000:C=C+1:GOTO600
590 RETURN
600 FORI=0TO250:POKEV+1,I:NEXT:X=164:Y=140:X1=0:Y1=0:A=44:K=0
610 POKEV,X:POKEV+1,Y:BX=X:BY=86:POKEV+6,BX:POKEV+7,BY:H=PEEK(V+30)
620 LI=LI-1:IFLI<1THENGOTO700
630 RETURN
640 IFA=30THENPOKEV+21,PEEK(V+21)AND251:GOTO660
650 POKEV+21,PEEK(V+21)AND253
660 P(A)=2:Q=1:J=0:IF164-X<0THENQ=-1
670 FORI=XTO164STEPQ:J=J-1.5:POKEV,I:POKEV+1,Y+J:NEXTI
680 POKEV,164:POKEV+1,76:A=12:X=164:Y=76:X1=0:Y1=0
690 RETURN
700 POKEV+21,0:PRINT"*****":PRINT"      YOUR SCORE WAS";SC
710 IFSC>HITHENPRINT"*****YOU HAVE THE HIGH SCORE!":HI=SC
720 POKE198,0:PRINT"HI-SCORE :";HI
730 PRINT"*****ANOTHER GO":INPUTAN$:IFLEFT$(AN$,1)="Y"THENZ=0:GOTO300
740 PRINT"J":END
750 K=PEEK(197):IFK<>64THENRETURN
760 ZZ=PEEK(56320)
770 IF(ZZAND5)=0THENK=22:RETURN
780 IF(ZZAND9)=0THENK=30:RETURN
790 IF(ZZAND6)=0THENK=31:RETURN
800 IF(ZZAND10)=0THENK=39:RETURN
810 K=64:RETURN
READY.

```


MAZE

In this game, the object is to move from one side of the maze to the other. It is fully REMed so that it could be used in your own games. The movement is obtained by using the keys:

'F' forward one location
'R' rotate 90% to the right
'L' rotate 90% to the left

The maze is totally random and the view of the maze is given using the 64s characters to produce a 3D view.

You start on one side of the maze and move to the other. You are facing in the correct direction to start, but will need to remember which direction you are facing otherwise you will get lost.

```

10 POKE53280,3:POKE53281,3
20 PRINT"
30 PRINT"
40 PRINT"  3 DIMENSIONAL MAZE
50 PRINT"
60 PRINT"  DISPLAY
70 PRINT"
80 PRINT"  ROUTINE
90 PRINT"
100 PRINT"  WITH
110 PRINT"
120 PRINT"
130 PRINT"  DEMO
140 PRINT"
150 PRINT"  MAZE
160 PRINT"
170 PRINT"
180 PRINT"  USE KEYS
190 PRINT"
200 PRINT"  F=FORWARD
210 PRINT"
220 PRINT"  R=RIGHT
230 PRINT"
240 PRINT"  L=LEFT
250 PRINT"
260 PRINT"
270 WI=10
280 HE=10
290 REM
300 REM
310 REM CREATE RANDOM MAZE
320 REM
330 REM
340 DIMV%(HE,WI),W%(HE,WI),L%(2),P1%(2,5),P2%(2,3)
350 A=RND(0)
360 REM
370 REM PUT A SOLID WALL AROUND MAZE
380 REM
390 FORI=0TOWI
400 W%(0,I)=1:W%(HE,I)=1
410 NEXT
420 FORI=0TOHE
430 W%(I,0)=1:W%(I,WI)=1
440 NEXT
450 X=INT(RND(1)*(HE-1)+1):SX=X
460 Y=1
470 C=1
480 REM
490 REM FIND POSSIBLE DIRECTIONS
500 REM
510 W%(X,Y)=1:J=0
520 IFW%(X-1,Y)<>0THEN540
530 J=J+1:JU(J)=1
540 IFW%(X+1,Y)<>0THEN560
550 J=J+1:JU(J)=2

```


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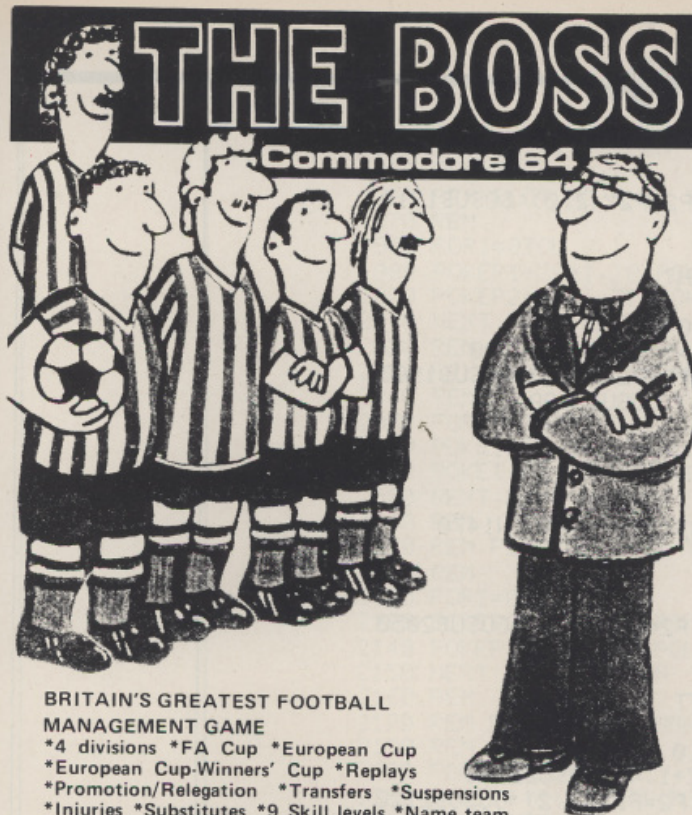
BYTEWELL

203 Court Road, Barry
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0446-742491.


```

560 IFWZ(X,Y-1)<>0THEN580
570 J=J+1:JU(J)=3
580 IFWZ(X,Y+1)<>0THEN600
590 J=J+1:JU(J)=4
600 IFJ=0THEN730
610 REM
620 REM CHOOSE ONE DIRECTION AT RANDOM
630 REM
640 ONJU(INT(RND(1)*J)+1)GOSUB2550,2570,2590,2610
650 REM
660 REM DO ANOTHER
670 REM
680 C=C+1:GOTO510
690 REM
700 REM THERE WAS NO EXIT, CHECK FOR
710 REM MAZE NEARLY FULL (95%)
720 REM
730 IFC>.90*((HE-1)*(WI-1))THEN840
740 REM
750 REM FIND START POINT FOR NEW BRANCH
760 REM
770 X=INT(RND(1)*(HE-1))+1
780 Y=INT(RND(1)*(WI-1))+1
790 IFWZ(X,Y)<>0THEN510
800 GOTO770
810 REM
820 REM FIND EXIT POINT
830 REM
840 X=INT(RND(1)*(HE-1))+1:FX=X
850 IFWZ(X,WI-1)=0THEN840
860 VZ(X,WI)=2:VZ(X,WI-1)=VZ(X,WI-1)+8
870 X=5X:Y=1:CD=54272
880 FORI=2TO0STEP-1:READLZ(I):NEXT
890 FORI=2TO0STEP-1:FORJ=0TO5:READP1Z(I,J):NEXT:NEXT
900 FORI=2TO0STEP-1:FORJ=0TO3:READP2Z(I,J):NEXT:NEXT
910 REM
920 REM
930 REM START MOVING THROUGH
940 REM
950 REM
960 DIR=3
970 PRINT"3":GOSUB1080: REM DISPLAY VIEW
980 GETA$:IFA$=""THEN980
990 IFA$="R"THENDIR=(DIR+1)AND3:GOTO970
1000 IFA$="L"THENDIR=(DIR-1)AND3:GOTO970
1010 IFA$<>"F"THEN980
1020 IFX+X1=0ORX+X1>HETHEN980
1030 IFY+Y1=0ORY+Y1>WETHEN980
1040 IF(VZ(X,Y)AND(2↑DIR))=0THEN980
1050 X=X+X1:Y=Y+Y1:IFX=FXANDY=WETHENEND
1060 GOTO970
1070 REM
1080 REM DISPLAY VIEW
1090 REM
1100 FORI=1TO23
1110 POKE1026+I*40,103:POKE55298+I*40,0
1120 POKE1026+I*40+24,101:POKE55298+I*40+24,0
1130 NEXT
1140 X2=0:Y2=0:FORZ=2TO0STEP-1
1150 D=DIR:GOSUB1830:X2=X2+X1:Y2=Y2+Y1
1160 IFX+X2=0ORX+X2>HETHENRETURN
1170 IFY+Y2=0ORY+Y2>WETHENRETURN
1180 IF(VZ(X,Y)AND(2↑D))=0THENRETURN
1190 REM
1200 REM CHECK RIGHT
1210 REM
1220 D=(DIR+1)AND3
1230 IF(VZ(X+X2,Y+Y2)AND(2↑D))=0THEN1300
1240 REM

```

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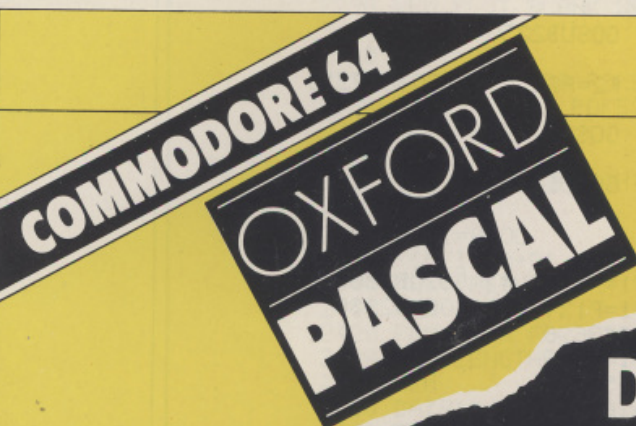
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 Oxford OX7 1JR, England
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 Telex 83147 Ref. OCSL

Listings

```

1250 REM EXIT TO RIGHT
1260 REM
1270 L=Z+1:P1=P1%(Z,0):P2=P2%(Z,0):GOSUB1910
1280 GOTO1370
1290 REM
1300 REM NO EXIT TO RIGHT
1310 REM
1320 IFRI=10RZ=2THEN1340
1330 L=L%(Z+1):P1=P1%(Z+1,3):GOSUB2380
1340 L=Z+1:P1=P1%(Z,0):P2=P2%(Z,0):GOSUB1980
1350 L=L%(Z):P1=P1%(Z,3):GOSUB2190
1360 REM
1370 REM CHECK LEFT
1380 REM
1390 D=(DIR-1)AND3
1400 IF(V%(X+X2,Y+Y2)AND(2+D))=0THEN1470
1410 REM
1420 REM EXIT TO LEFT
1430 REM
1440 L=Z+1:P1=P1%(Z,1):P2=P2%(Z,1):GOSUB2050
1450 GOTO1540
1460 REM
1470 REM NO EXIT TO LEFT
1480 REM
1490 IFLE=10RZ=2THEN1510
1500 L=L%(Z+1):P1=P1%(Z+1,4):GOSUB2380
1510 L=Z+1:P1=P1%(Z,2):P2=P2%(Z,2):GOSUB2120
1520 L=L%(Z):P1=P1%(Z,4):GOSUB2250
1530 REM
1540 REM CHECK IN FRONT
1550 REM
1560 D=DIR
1570 IF(V%(X+X2,Y+Y2)AND(2+D))=0THEN1630
1580 IFRI=0THEN1600
1590 L=L%(Z):P1=P1%(Z,3):GOSUB2190
1600 IFLE=0THEN1690
1610 L=L%(Z):P1=P1%(Z,4):GOSUB2250
1620 GOTO1690
1630 L=L%(Z):P1=P1%(Z,5):P2=P2%(Z,3):GOSUB2310
1640 IFRI=1THEN1660
1650 L=L%(Z):P1=P1%(Z,3):GOSUB2190
1660 IFLE=1THEN1680
1670 L=L%(Z):P1=P1%(Z,4):GOSUB2250
1680 Z=-10
1690 NEXTZ
1700 IFZ=-11THENRETURN
1710 IFLE=0THENL=L%(0):P1=P1%(0,4):GOSUB2380
1720 IFRI=0THENL=L%(0):P1=P1%(0,3):GOSUB2380
1730 POKE1436,77:POKECD+1436,6
1740 POKE1440,78:POKECD+1440,6
1750 POKE1596,78:POKECD+1596,6
1760 POKE1600,77:POKECD+1600,6
1770 RETURN
1780 REM
1790 REM DETERMINE X AND Y INCREMENTS
1800 REM TO MAZE DEPENDANT UPON
1810 REM DIRECTION D
1820 REM
1830 IFD=0THENX1=1:Y1=0
1840 IFD=1THENX1=0:Y1=-1
1850 IFD=2THENX1=-1:Y1=0
1860 IFD=3THENX1=0:Y1=1
1870 RETURN
1880 REM
1890 REM PLOT EXIT TO RIGHT
1900 REM
1910 FORI=0TOL
1920 POKEI+P1,100:POKECD+I+P1,6
1930 POKEI+P2,99:POKECD+I+P2,6

```


Listings

```

1940 NEXT:RI=1:RETURN
1950 REM
1960 REM PLOT NO EXIT TO RIGHT
1970 REM
1980 FORI=0TOL
1990 POKEP1-39*I,78:POKECD+P1-39*I,6
2000 POKEP2+41*I,77:POKECD+P2+I*41,6
2010 NEXT:RI=0:RETURN
2020 REM
2030 REM PLOT EXIT TO LEFT
2040 REM
2050 FORI=LTO0STEP-1
2060 POKEI+P1,100:POKECD+I+P1,6
2070 POKEI+P2,99:POKECD+I+P2,6
2080 NEXT:LE=1:RETURN
2090 REM
2100 REM PLOT NO EXIT TO LEFT
2110 REM
2120 FORI=0TOL
2130 POKEP2-39*I,78:POKECD+P2-39*I,6
2140 POKEP1+41*I,77:POKECD+P1+I*41,6
2150 NEXT:LE=0:RETURN
2160 REM
2170 REM PLOT RIGHT HAND UPRIGHT
2180 REM
2190 FORI=0TOL
2200 POKEI*40+P1,101:POKECD+I*40+P1,6
2210 NEXT:RETURN
2220 REM
2230 REM PLOT LEFT HAND UPRIGHT
2240 REM
2250 FORI=0TOL
2260 POKEI*40+P1,103:POKECD+I*40+P1,6
2270 NEXT:RETURN
2280 REM
2290 REM PLOT BLANK WALL HORIZONTALS
2300 REM
2310 FORI=0TOL
2320 POKEI+P1,100:POKECD+I+P1,6
2330 POKEI+P2,99:POKECD+I+P2,6
2340 NEXT:RETURN
2350 REM
2360 REM BLANK UPRIGHT
2370 REM
2380 FORI=0TOL
2390 POKEI*40+P1,32
2400 NEXT:RETURN
2410 REM
2420 REM DATA FOR UPRIGHT AND HORIZONTAL
2430 REM LENGTHS
2440 REM
2450 DATA14,8,4
2460 REM
2470 REM DATA FOR START POSITIONS
2480 REM
2490 DATA1206,1187,1067,1246,1230,1191
2500 DATA1323,1311,1231,1363,1353,1314
2510 DATA1401,1394,1354,1441,1435,1396
2520 DATA1846,1827,1947,1831
2530 DATA1723,1711,1791,1714
2540 DATA1641,1634,1674,1636
2550 VX(X,Y)=VX(X,Y)+4:X=X-1:VX(X,Y)=VX(X,Y)+1
2560 RETURN
2570 VX(X,Y)=VX(X,Y)+1:X=X+1:VX(X,Y)=VX(X,Y)+4
2580 RETURN
2590 VY(X,Y)=VY(X,Y)+2:Y=Y-1:VY(X,Y)=VY(X,Y)+8
2600 RETURN
2610 VY(X,Y)=VY(X,Y)+8:Y=Y+1:VY(X,Y)=VY(X,Y)+2
2620 RETURN

```


64 adventures

This is a game by Toby Hughes, 13 years old from Reigate. It's a sort of adventure game which involves the Transmat – a machine similar to the one used by Captain Kirk and his crew on the Starship Enterprise. Remember Kirk's phrase "Beat me up, Scottie,"?

```

0 B%(7)=-1
1 DATA 25,6,24,5,3,3,3,4,5,6,25,6,24,5,3,3,3,64,3,3,5,4,4,5,3,3,5,4,5,6
2 DATA 15,6,24,5,3,3,3,4,5,6,25,6,24,5,3,3,3,94,0
3 POKE 53280,1:POKE 53281,1:PRINT "X":GOSUB 10299
5 PRINT "X"
10 PRINT TAB(16);"TRANSMAT"
11 PRINT TAB(16);"":PRINT "■"
15 PRINT "YOU MUST RESCUE YOUR THREE "
20 PRINT "FRIENDS BY TRANSMATTING "
25 PRINT "FROM PLANET TO PLANET AND "
30 PRINT "FIND YOUR SPACESHIP..... "
40 PRINT "T'=TRANSMAT"
45 PRINT "H'=HELP"
50 PRINT "I'=INVENTORY"
55 PRINT "N','S','E','W'=DIRECTIONS"
56 GOSUB 20000
60 PRINT "GOOD LUCK"
100 REM SET POSITION
110 P=100:N=0:S=0:E=0:W=0
120 DIM OB%(9),OB$(9),SI$(9)
130 FOR I=1 TO 9:READ OB%(I),OB$(I),SI$(I)
135 NEXT
140 DATA 99,LAZER,A PHOTON LAZER IS ON THE GROUND
145 DATA 80,EXPLOSIVES,THERE ARE EXPLOSIVES LYING HERE
150 DATA 87,GOLD,THERE IS SOME GOLD NEAR YOUR FEET
155 DATA 78,SCARF,A SCARF IS NEARBY
160 DATA 65,ZORA,ZORA IS STANDING NEARBY
165 DATA 43,SCREWDRIIVER,YOUR SONIC SCREWDRIIVER IS HERE
170 DATA 60,VENAN,VENAN IS HERE
180 DATA 7,JEWEL,A LARGE SHINY JEWEL IS ON THE GROUND
190 DATA 4,BERIX,BERIX IS SITTING HERE
200 DAX(1)=0:DAX(2)=0
210 FOR K=1 TO 3:CYZ(K)=0:NEXT
220 SDZ=0:FOR I=1 TO 3:YEZ(I)=0:NEXT
230 MOZ=0:SWZ=0:MAZ=0:P2=100
240 P=P2:IF P>90 THEN ON P-90 GOSUB 0,0,0,0,0,0,6186,6189,6192,6195:GOTO 340
250 IF P>80 THEN ON P-80 GOSUB 0,0,0,0,0,0,6174,6177,6180,6183:GOTO 340
260 IF P>70 THEN ON P-70 GOSUB 0,0,0,0,0,0,6162,6165,6168,6171:GOTO 340
270 IF P>60 THEN ON P-60 GOSUB 6147,6150,6153,6156,6159,0,0,0,0,0:GOTO 340
280 IF P>50 THEN ON P-50 GOSUB 6120,6123,6126,6129,6132,0,6135,6138,6141,6144:GOTO 340
290 IF P>40 THEN ON P-40 GOSUB 6093,6096,6099,6102,6105,0,6108,6111,6114,6117:GOTO 340
300 IF P>30 THEN ON P-30 GOSUB 0,0,0,0,0,0,6081,6084,6087,6090:GOTO 340
310 IF P>20 THEN ON P-20 GOSUB 6054,6057,6060,6063,6066,0,6069,6072,6075,6078:GOTO 340
320 IF P>10 THEN ON P-10 GOSUB 6028,6031,6034,6037,6040,0,6042,6045,6048,6051:GOTO 340
330 IF P>0 THEN ON P GOSUB 6001,6004,6007,6010,6013,0,6016,6019,6022,6025
340 IF P=88 AND DAX(1)<>1 THEN 6500
350 IF P=77 AND DAX(2)<>1 THEN 6500
360 IF P=62 AND CYZ(1)<>1 THEN 7000

```



```

370 IF P=41 AND CY%(2)<>1 THEN 7000
380 IF P=45 AND CY%(3)<>1 THEN 7000
390 IF P=48 AND SD%<>1 THEN 7500
400 IF P=27 AND VE%(1)<>1 THEN 8000
410 IF P=29 AND VE%(2)<>1 THEN 8000
420 IF P=9 AND VE%(3)<>1 THEN 8000
430 IF P=14 AND MO%<>1 THEN 8500
440 IF P=11 AND SW%<>1 THEN 9000
450 IF P=1 AND MA%<>1 THEN 9500
460 FOR I=1 TO 9:IF OB%(I)=P THEN PRINT SI$(I)
465 NEXT
470 PRINT"YOU CAN GO :";
480 IF N>0 THEN PRINT" NORTH";
490 IF E>0 THEN PRINT" EAST";
500 IF S>0 THEN PRINT" SOUTH";
510 IF W>0 THEN PRINT" WEST";
520 IF P=77 OR P=45 OR P=57 THEN PRINT" TRANSMAT":PRINT"■"
530 PRINT CHR$(13)
540 INPUT"WHAT SHALL I DO NOW ■";I$
545 PRINT"■"
550 REM CHECK COMMAND
560 IF I$="N" OR I$="E" OR I$="S" OR I$="W" THEN 10100
570 IF I$="I" THEN 2000
580 IF I$="H" THEN 2100
590 IF I$="T" THEN 850
600 FOR I=1 TO LEN(I$)
610 IF MID$(I$,I,1)=" " THEN 640
620 NEXT
630 PRINT"PLEASE CAN YOU USE TWO WORDS":GOTO 540
640 FOR SP=1 TO LEN(I$)
650 IF MID$(I$,SP,1)=" " THEN 670
660 NEXT
670 VE$=LEFT$(I$,SP-1)
680 NO$=RIGHT$(I$, (LEN(I$)-SP))
690 IF VE$="GET"OR VE$="GRAB"OR VE$="TAKE"OR VE$="CARRY" THEN 3000
700 IF VE$="DROP"OR VE$="LOSE"OR VE$="LEAVE" THEN 3100
720 IF VE$="KILL" THEN 900
730 IF VE$="SWIM"OR VE$="FLOAT" THEN 1000
790 PRINT"I DON'T KNOW HOW TO :";VE$:GOTO 540
795 IF P=45ORP=57ORP=77THENPRINT"I CANNOT GO THAT WAY":GOTO 240
800 IF I$="N" AND N>0 THEN P2=P-10:GOTO 240
810 IF I$="E" AND E>0 THEN P2=P+1:GOTO 240
820 IF I$="S" AND S>0 THEN P2=P+10:GOTO 240
830 IF I$="W" AND W>0 THENP2=P-1:GOTO 240
840 PRINT"SORRY -YOU CAN'T GO THAT WAY!":GOTO 540
850 IF P=77 OR P=45 OR P=57 THEN 860
855 PRINT"THERE IS NO TRANSMAT CAPSULE HERE":GOTO 540
860 PRINT"YOU STEP INTO THE CAPSULE"
870 PRINT"AND DE-MATERIALISE"
880 IF P=77 THEN P2=61:GOTO 240
890 IF P=45 THEN P2=10:GOTO 240
895 IF P=57 THEN P2=25:GOTO 240
900 GOTO 1060
1000 IF P=11 THEN 1610
1010 IF VE$="SWIM"AND P=39ORP=40ORP=48ORP=49ORP=50 THEN 1020
1015 PRINT"I CANNOT SEE ANY WATER!":GOTO 540
1020 IF NO$="NORTH"ORNO$="SOUTH"ORNO$="EAST"OR NO$="WEST"THEN 1050
1025 PRINT"PLEASE STATE DIRECTION - IN A FULL WORD":GOTO 540
1050 GOTO 800
1060 IF NO$="ROBOT" THEN 1068
1061 IF NO$="FOREX" THEN 1072
1062 IF NO$="DRAGON" THEN 1076

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Listings

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1063 IF NO$="BEAST" THEN 1080
1064 IF NO$="MONSTER" THEN 1084
1065 IF NO$="SHADOW" THEN 1090
1066 IF NO$="ZORA" OR NO$="VENAN" OR NO$="BERIX" THEN PRINT "NO I WON'T": GOTO 240
1067 PRINT "I CANNOT DO THAT": GOTO 240
1068 IF P<88 AND P<77 THEN PRINT "I CAN'T SEE A ROBOT HERE": GOTO 240
1069 IF OB%(2)=-1 THEN 1071
1070 PRINT "YOU CAN'T YOU ARE DEAD!": END
1071 PRINT "OK-YOU BLEW IT UP": GOTO 1500
1072 IF P<62 AND P<41 AND P<45 THEN PRINT "I CAN'T SEE A FOREX HERE": GOTO 240
1073 IF OB%(3)=-1 THEN 1075
1074 PRINT "YOU CAN'T YOU ARE DEAD!": END
1075 PRINT "OK.THE GOLD STOPPED HIS BREATHING": GOTO 1500
1076 IF P<48 THEN PRINT "I CAN'T SEE A DRAGON HERE": GOTO 240
1077 IF OB%(1)=-1 THEN 1079
1078 PRINT "YOU CAN'T YOU ARE DEAD!": END
1079 PRINT "OK YOU BLASTED IT WITH THE PHOTON LAZER.": GOTO 1500
1080 IF P<27 AND P<29 AND P<9 THEN PRINT "I CAN'T SEE A BEAST HERE.": GOTO 240
1081 IF OB%(6)=-1 THEN 1083
1082 PRINT "YOU CAN'T YOU ARE DEAD.": END
1083 PRINT "OK YOU BLOCKED THE SIGNALS TO IT WITH THE SONIC SCREWDRIER": GOTO 1500
0
1084 IF P<14 THEN PRINT "I CAN'T SEE THE MONSTER HERE!": GOTO 240
1085 IF OB%(1)=-1 THEN 1087
1086 PRINT "YOU CAN'T YOU ARE DEAD!": END
1087 PRINT "OK YOU BLASTED IT TO BITS WITH THE LAZER": GOTO 1500
1088 IF P=1 THEN 1090
1089 PRINT "THE SHADOW IS NOT HERE!": GOTO 240
1090 IF OB%(9)=-1 THEN PRINT "BERIX KNOCKS HIM OUT.": X=0: MAX=1: GOTO 1092
1091 PRINT "SORRY-YOU ARE DEAD!": END
1092 PRINT "YOU HAVE YOUR SPACESHIP BACK!"
1093 PRINT "YOU HAVE:"
1094 IF OB%(9)=-1 THEN PRINT OB%(9): X=X+1
1095 IF OB%(7)=-1 THEN PRINT OB%(7): X=X+1
1096 IF OB%(5)=-1 THEN PRINT OB%(5): X=X+1
1097 IF X=3 THEN 1110
1098 IF OB%(9)<0 THEN PRINT "YOU DON'T HAVE THE BERIX"
1099 IF OB%(7)<0 THEN PRINT "YOU DON'T HAVE VENAN."
1100 IF OB%(5)<0 THEN PRINT "YOU DON'T HAVE ZORA"
1101 PRINT "YOU HAVE FAILED!": END
1110 PRINT "YOU HAVE WON! CONGRATULATIONS!"
1111 END
1500 IF P=88 THEN DA%(1)=1
1510 IF P=77 THEN DA%(2)=1
1520 IF P=62 THEN CY%(1)=1
1530 IF P=41 THEN CY%(2)=1
1540 IF P=45 THEN CY%(3)=1
1550 IF P=48 THEN SD% =1
1560 IF P=27 THEN YE%(1)=1
1570 IF P=29 THEN YE%(2)=1
1580 IF P= 9 THEN YE%(3)=1
1590 IF P=14 THEN MO% =1
1600 GOTO 240
1610 IF OB%(8)=-1 THEN PRINT "OK THE ANTIGRAVITY JEWEL KEPT YOU AFLOAT": GOTO 1620
1615 PRINT "SORRY-YOU ARE DEAD!!!": END
1620 SW%=1: GOTO 240
2000 PRINT "YOUR INVENTORY IS:": IV=0
2010 FOR I=1 TO 4
2020 IF OB%(I)=-1 THEN PRINT OB%(I): IV=IV+1
2030 NEXT
2040 IF OB%(6)=-1 THEN PRINT OB%(6): IV=IV+1
2050 IF OB%(8)=-1 THEN PRINT OB%(8): IV=IV+1

```


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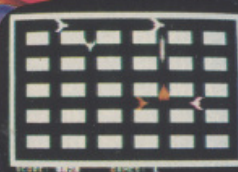
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```

2060 IF IV=0 THEN PRINT"NOTHING"
2070 PRINT"COMPANIONS:";IX=0
2080 IF OB%(5)=-1 THEN PRINTOB%(5);IX=IX+1
2090 IF OB%(7)=-1 THEN PRINTOB%(7);IX=IX+1
2091 IF OB%(9)=-1 THEN PRINTOB%(9);IX=IX+1
2092 IF IX=0 THEN PRINT"NOBODY"
2093 GOTO 540
2100 IFF=100THENPRINT"TRY GOING NORTH-PRESS 'N'!":GOTO 240
2110 IFF=88ANDDA%(1)<>1THENPRINT"TRY KILLING IT.":GOTO 240
2115 IFF=77ANDDA%(2)<>1THENPRINT"TRY KILLING IT.":GOTO 240
2120 IFF=62ANDCY%(1)<>1THENPRINT"KILL IT .":GOTO 240
2125 IFF=41ANDCY%(2)<>1THENPRINT"KILL IT .":GOTO 240
2126 IFF=45ANDCY%(3)<>1THENPRINT"KILL IT .":GOTO 240
2130 IFF=48ANDSD%(1)<>1THENPRINT"WATCH OUT FOR HIS BREATH":GOTO 240
2135 IFF=27ANDYE%(1)<>1THENPRINT"ISN'T HE BEASTLY.":GOTO 240
2136 IFF=29ANDYE%(2)<>1THENPRINT"ISN'T HE BEASTLY.":GOTO 240
2137 IFF= 9ANDYE%(3)<>1THENPRINT"ISN'T HE BEASTLY.":GOTO 240
2140 IFF=14ANDMO%(1)<>1THENPRINT"KILL IT.":GOTO240
2150 IFF=11ANDSW%(1)<>1THENPRINT"TRY NOT TO SINK BUT SWIM!":GOTO 240
2160 IFF=1ANDMA%(1)<>1THENPRINT"TURN ON THE LIGHT.":GOTO 240
2180 PRINT"YOU'RE DOING FINE":GOTO 240
3000 K=0:FOR I=1 TO 9
3010 IF OB%(I)=NO$ THEN 3020
3015 K=K+1:NEXT
3016 IF K=9 THEN PRINT"I DON'T UNDERSTAND ";NO$:GOTO 240
3020 IF OB%(I)=-1 THEN PRINT"YOU HAVE GOT IT.":GOTO 540
3030 IF OB%(I)<>P THEN PRINT"IT ISN'T HERE.":GOTO 540
3040 PRINT"OK":OB%(I)=-1
3050 GOTO 540
3100 K=0:FOR I=1 TO 9
3110 IF OB%(I)=NO$ THEN 3120
3115 K=K+1:NEXT
3116 IF K=9THENPRINT"I DON'T UNDERSTAND ";NO$:GOTO 240
3120 IF OB%(I)<>-1 THEN PRINT"YOU HAVEN'T GOT IT.":GOTO 540
3130 PRINT"OK":OB%(I)=P
3140 GOTO 540
6000 REM LOCATIONS
6001 REM LOCATION 1
6002 PRINT"YOU HAVE FOUND YOUR SPACESHIP"
6003 N=0:S=0:E=0:W=0:RETURN
6004 REM LOCATION 2
6005 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6006 N=0:S=12:E=3:W=0:RETURN
6007 REM LOCATION 3
6008 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6009 N=0:S=13:E=4:W=2:RETURN
6010 REM LOCATION 4
6011 PRINT"YOU ARE INSIDE A SMALL WOODEN HUT"
6012 N=0:S=14:E=0:W=3:RETURN
6013 REM LOCATION 5
6014 PRINT"YOU ARE IN THE REMAINS OF A CITY"
6015 N=0:S=15:E=0:W=4:RETURN
6016 REM LOCATION 7
6017 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6018 N=0:S=17:E=0:W=0:RETURN
6019 REM LOCATION 8
6020 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6021 N=0:S=0:E=0:W=7:RETURN
6022 REM LOCATION 9
6023 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6024 N=0:S=0:E=0:W=8:RETURN
6025 REM LOCATION 10

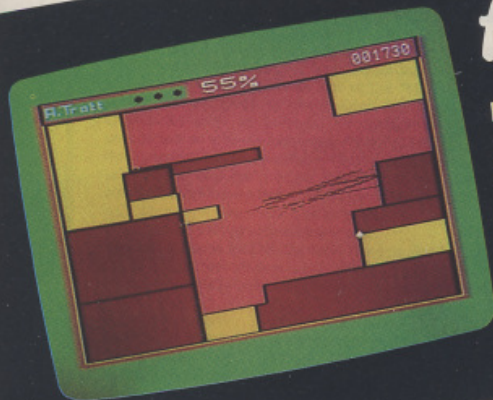
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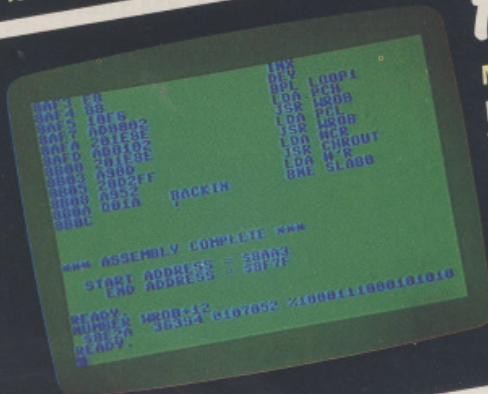
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MIKRO is a full 6502/6510 ASSEMBLER with the power that professional programmers need, yet so simple to use that we recommend it to beginners! The MIKRO cartridge has many other facilities including editing commands and a machine language monitor, all for £57.50.

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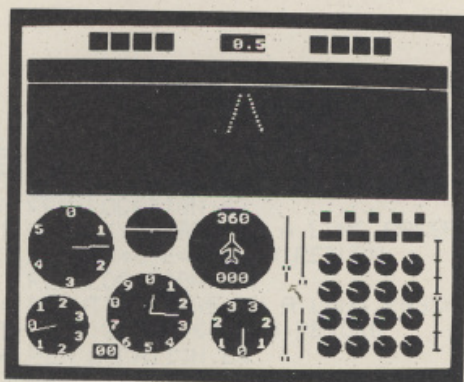


The Best 64 Software

Listings

```
6026 PRINT"YOU HAVE TRANSMATTED TO A FLAT PLAIN"
6027 N=0:S=20:E=0:W=9:RETURN
6028 REM LOCATION 11
6029 PRINT"YOU ARE ON A PLAIN"
6030 N=1:S=21:E=12:W=0:RETURN
6031 REM LOCATION 12
6032 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6033 N=2:S=22:E=13:W=12:RETURN
6034 REM LOCATION 13
6035 PRINT"YOU ARE IN THE REMAINS OF A CITY"
6036 N=3:S=23:E=0:W=0:RETURN
6037 REM LOCATION 14
6038 PRINT"YOU ARE IN A MASS OF DENSE UNDERGROWTH"
6039 N=4:S=24:E=15:W=0:RETURN
6040 REM LOCATION 15
6041 PRINT"YOU ARE IN THE REMAINS OF A CITY":N=5:S=0:E=0:W=14:RETURN
6042 REM LOCATION 17
6043 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6044 N=0:S=27:E=18:W=0:RETURN
6045 REM LOCATION 18
6046 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6047 N=0:S=28:E=0:W=17:RETURN
6048 REM LOCATION 19
6049 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6050 N=9:S=29:E=20:W=18:RETURN
6051 REM LOCATION 20
6052 PRINT"YOU ARE ON A LARGE PLAIN"
6053 N=0:S=30:W=19:E=0:RETURN
6054 REM LOCATION 21
6055 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6056 N=11:S=0:E=22:W=0:RETURN
6057 REM LOCATION 22
6058 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6059 N=12:S=0:E=0:W=21:RETURN
6060 REM LOCATION 23
6061 PRINT"YOU ARE IN THE REMAINS OF A CITY"
6062 N=13:S=0:E=24:W=0:RETURN
6063 REM LOCATION 24
6064 PRINT"YOU ARE IN THE REMAINS OF A CITY"
6065 N=14:S=0:E=0:W=23:RETURN
6066 REM LOCATION 25
6067 PRINT"YOU HAVE TRANSMATTED TO A FOREST"
6068 N=15:S=0:E=0:W=24:RETURN
6069 REM LOCATION 27
6070 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6071 N=0:S=37:E=28:W=0:RETURN
6072 REM LOCATION 28
6073 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6074 N=18:S=38:E=0:W=27:RETURN
6075 REM LOCATION 29
6076 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6077 N=0:S=39:E=30:W=0:RETURN
6078 REM LOCATION 30
6079 PRINT"YOU ARE ON A WIDE OPEN PLAIN"
6080 N=20:S=40:E=0:W=29:RETURN
6081 REM LOCATION 37
6082 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6083 N=0:S=47:E=38:W=0:RETURN
6084 REM LOCATION 38
6085 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6086 N=28:S=0:E=39:W=37:RETURN
6087 REM LOCATION 39
```


747 Flight Simulator

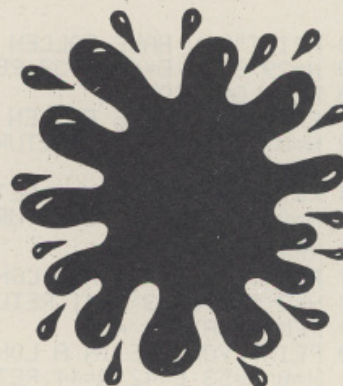


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6088 PRINT"YOU HAVE FALLEN INTO A LAKE"
6089 N=29:S=49:E=40:W=38:RETURN
6090 REM LOCATION 40
6091 PRINT"YOU HAVE FALLEN INTO A LAKE"
6092 N=0:S=50:E=0:W=0:RETURN
6093 REM LOCATION 41
6094 PRINT"YOU ARE IN A METALLIC ROOM"
6095 N=0:S=51:E=0:W=0:RETURN
6096 REM LOCATION 42
6097 PRINT"YOU ARE IN A LONG PASSAGE"
6098 N=0:S=0:E=43:W=41:RETURN
6099 REM LOCATION 43
6100 PRINT"YOU ARE IN A LONG PASSAGE"
6101 N=0:S=53:E=42:W=44:RETURN
6102 REM LOCATION 44
6103 PRINT"YOU ARE IN A METALLIC ROOM"
6104 N=0:S=0:E=0:W=43:RETURN
6105 REM LOCATION 45
6106 PRINT"YOU ARE IN THE TRANSMAT ROOM"
6107 N=0:S=0:E=0:W=0:RETURN
6108 REM LOCATION 47
6109 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6110 N=0:S=0:E=48:W=0:RETURN
6111 REM LOCATION 48
6112 PRINT"YOU HAVE FALLEN INTO A LAKE"
6113 N=0:S=58:E=49:W=0:RETURN
6114 REM LOCATION 49
6115 PRINT"YOU HAVE FALLEN INTO A LAKE"
6116 N=39:S=59:E=50:W=0:RETURN
6117 REM LOCATION 50
6118 PRINT"YOU HAVE FALLEN INTO A LAKE"
6119 N=0:S=0:E=0:W=49:RETURN
6120 REM LOCATION 51
6121 PRINT"YOU ARE IN A METALIC ROOM"
6122 N=41:S=0:E=52:W=0:RETURN
6123 REM LOCATION 52
6124 PRINT"YOU ARE IN A LONG PASSAGE"
6125 N=0:S=62:E=53:W=0:RETURN
6126 REM LOCATION 53
6127 PRINT"YOU ARE IN A METALIC ROOM"
6128 N=43:S=0:E=54:W=52:RETURN
6129 REM LOCATION 54
6130 PRINT"YOU ARE IN A LONG PASSAGE"
6131 N=44:S=0:E=55:W=53:RETURN
6132 REM LOCATION 55
6133 PRINT"YOU ARE IN A LONG PASSAGE"
6134 N=45:S=0:E=0:W=0:RETURN
6135 REM LOCATION 57
6136 PRINT"YOU HAVE FOUND THE TRANSMAT ROOM"
6137 N=0:S=0:E=0:W=0:RETURN
6138 REM LOCATION 58
6139 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6140 N=48:S=0:E=0:W=57:RETURN
6141 REM LOCATION 59
6142 PRINT"YOU ARE IN A DARK GLOOMY FOREST"
6143 N=49:S=0:E=60:W=0:RETURN
6144 REM LOCATION 60
6145 PRINT"YOU ARE IN A DARK GLOOMY CAVE"
6146 N=0:S=0:E=0:W=59:RETURN
6147 REM LOCATION 61

```



```

6148 PRINT"YOU HAVE TRANSMATTED TO A METALIC ROOM"
6149 N=51:S=0:E=62:W=0:RETURN
6150 REM LOCATION 62
6151 PRINT"YOU ARE IN A LONG PASSAGE"
6152 N=52:S=0:E=63:W=0:RETURN
6153 REM LOCATION 63
6154 PRINT"YOU ARE IN A LONG PASSAGE"
6155 N=53:S=0:E=64:W=0:RETURN
6156 REM LOCATION 64
6157 PRINT"YOU ARE IN A METALIC ROOM"
6158 N=0:S=0:E=65:W=63:RETURN
6159 REM LOCATION 65
6160 PRINT"YOU ARE IN THE JAIL"
6161 N=55:S=0:E=0:W=0:RETURN
6162 REM LOCATION 77
6163 PRINT"YOU HAVE FOUND THE TRANSMAT ROOM"
6164 N=0:S=0:E=0:W=0:RETURN
6165 REM LOCATION 78
6166 PRINT"YOU ARE IN A METALIC ROOM"
6167 N=0:S=0:E=79:W=0:RETURN
6168 REM LOCATION 79
6169 PRINT"YOU ARE IN A LONG PASSAGE"
6170 N=0:S=89:E=80:W=78:RETURN
6171 REM LOCATION 80
6172 PRINT"YOU ARE IN A METALIC ROOM"
6173 N=0:S=0:E=0:W=79:RETURN
6174 REM LOCATION 87
6175 PRINT"YOU ARE IN A LONG PASSAGE"
6176 N=77:S=97:E=0:W=0:RETURN
6177 REM LOCATION 88
6178 PRINT"YOU ARE IN THE CONTROL ROOM"
6179 N=0:S=98:E=89:W=87:RETURN
6180 REM LOCATION 89
6181 PRINT"YOU ARE IN A METALIC ROOM"
6182 N=79:S=99:E=0:W=88:RETURN
6183 REM LOCATION 90
6184 PRINT"YOU ARE IN A LONG PASSAGE"
6185 N=80:S=0:E=0:W=89:RETURN
6186 REM LOCATION 97
6187 PRINT"YOU ARE IN A METALIC ROOM"
6188 N=87:S=0:E=98:W=0:RETURN
6189 REM LOCATION 98
6190 PRINT"YOU ARE IN A LONG PASSAGE"
6191 N=88:S=0:E=99:W=97:RETURN
6192 REM LOCATION 99
6193 PRINT"YOU ARE IN A LONG PASSAGE"
6194 N=0:S=0:E=0:W=98:RETURN
6195 REM LOCATION 100
6196 PRINT"YOU ARE IN A METALIC ROOM"
6197 N=90:S=0:E=0:W=0:RETURN
6500 PRINT"A ROBOT IS COMING TOWARDS YOU"
6510 PRINT"IT SCREAMS 'INTRUDER'"
6520 PRINT"EXTERMINATE! EXTERMINATE!"
6530 GOTO 10000
7000 PRINT"A HUGE METAL FIGURE IS BEARING DOWN ON YOU."
7010 PRINT"IT IS A FOREX!"
7020 PRINT"IT RAISES ITS WEAPON!"
7030 GOTO 10000
7500 PRINT"A DRAGON COMES OUT OF THE LAKE."
7510 PRINT"IT BREATHE FIRE AT YOU"
7520 PRINT"BUT MISSES!"

```



```

7530 GOTO 10000
8000 PRINT "A GREAT LUMBERING SHAPE JUMPS OUT ON YOU."
8010 PRINT "IT IS A ENORMOUS BEAST!"
8020 PRINT "ITS CLAWS REACH FOR YOUR THROAT."
8030 GOTO 10000
8500 PRINT "AN ENORMOUS MONSTER IS IN FRONT OF YOU."
8510 PRINT "IT HAS SEEN YOU!"
8520 GOTO 10000
9000 PRINT "YOU ARE SINKING INTO THE GROUND!"
9010 PRINT "YOU ARE IN A SWAMP!"
9020 PRINT "YOU ARE UP TO YOUR KNEES, YOUR SHOULDERS."
9030 GOTO 10000
9500 PRINT "YOU HEAR A SNEER AND THE SHADOW APPEARS."
9510 PRINT "HE RAISES HIS WEAPON "
9520 PRINT "AND WARNS YOU NOT TO TAKE ANOTHER STEP."
9530 GOTO 10000
10000 PRINT
10010 PRINT "YOU CANNOT MOVE UNTIL YOU HAVE DEFEATED IT....."
10020 PRINT "OR BEEN DEFEATED!!"
10030 GOTO 540
10100 IF P=88 AND DA%(1)=0 THEN 10200
10101 IF P=77 AND DA%(2)=0 THEN 10200
10102 IF P=62 AND CY%(1)=0 THEN 10200
10103 IF P=41 AND CY%(2)=0 THEN 10200
10104 IF P=45 AND CY%(3)=0 THEN 10200
10105 IF P=48 AND SD% =0 THEN 10200
10106 IF P=27 AND YE%(1)=0 THEN 10200
10107 IF P=29 AND YE%(2)=0 THEN 10200
10108 IF P= 9 AND YE%(3)=0 THEN 10200
10109 IF P=14 AND MO% =0 THEN 10200
10110 IF P=1 AND MA% =0 THEN 10200
10111 GOTO 795
10200 IF I$="N" OR I$="S" OR I$="E" OR I$="W" THEN PRINT "YOU CAN'T DO THAT...YET!!"
10210 GOTO 540
10299 PRINT TAB(8); "PLEASE TURN UP THE VOLUME": FOR K=1 TO 1000: NEXT K
10300 PRINT "O": PRINT TAB(16); "TRANSMAT"
10365 PRINT TAB(12); "BY TOBY HUGHES"
10366 PRINT TAB(12); "DECEMBER 1983"
10367 POKE 54295, 0: POKE 54296, 15
10370 RESTORE
10380 W=54272
10390 POKE W+6, 0: POKE W+5, 45
10400 POKE W+3, 99: PP=2500
10410 READ W: IF W=0 THEN POKE 54276, 0: RETURN
10420 RR=INT(W/10): QQ=(W-10*RR)*PP
10430 POKE 54273, QQ/256: POKE 54272, QQ AND 255
10440 POKE 54276, 0: POKE 54276, 65: FOR NN=1 TO 70*(RR+1): NEXT NN
10450 GOTO 10410
20000 PRINT "OTHER THAN THESE YOU MUST USE TWO WORDS."
20010 PRINT "THE NAMES OF YOUR COMPANIONS ARE:"
20020 PRINT "ZORA, VENAN, BERIX."
20030 PRINT "TREAT THEM AS OBJECTS-GET ZORA"
20040 PRINT "TO KILL AN ENEMY JUST TYPE KILL....."
20050 PRINT "AND IF YOU HAVE THE CORRECT OBJECT THEN"
20060 PRINT "YOU WILL KILL IT."
20070 PRINT "PRESS FUNCTION 1/ TO CONTINUE."
20080 GET A$: IF A$="" THEN 20080
20090 IF A$="■" THEN RETURN
20100 GOTO 20080
READY.

```


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